Language development in children with psychiatric impairment.
Blankenstijn, C.; Scheper, A.R.

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Language development in children with psychiatric impairment

In recent years there has been an increase in awareness that language impairment (LI) and psychiatric impairment (PI) frequently co-occur. Empirical data have shown that language disordered children have a significantly increased risk of developing a psychiatric disorder, and conversely, children being treated for psychiatric disorders have a high prevalence of language disorders.

In this dissertation, spontaneous language analysis gives detailed information about language developmental patterns and the deviances in 120 Dutch-speaking children with psychiatric impairment (PI-children) between the ages of four and ten in two genres, conversational interview and narrative.

We examined the morphological/syntactic abilities to realize lexical and functional categories correctly, being particularly interested in the expression of grammaticality, connectivity, transitivity, temporality and morphological/syntactic packaging in both genres. We also studied the semantic/pragmatic abilities to tell a narrative and to take turns smoothly, to be responsive, to repair miscommunication and to transmit relevant information, such as linking sentences coherently and cohesively, including the ability to establish clear co-referential cohesion in both genres.

Our micro-level analysis results in a strong comorbid relationship of LI in the 120 Dutch-speaking PI-children. Furthermore, the language impairment in both morphological/syntactic and semantic/pragmatic areas proved to be strongly linked in this group. The PI-children with internalizing disorders proved to be less severely language impaired in both areas than the PI-children with externalizing disorders. The PI-children with PDD NOS proved to be the most severely language impaired in both language areas.

We showed how severe and widespread the language difficulties of PI-children are. This fact needs to become well-known to all researchers and clinicians in the field, so that these children can be properly diagnosed, treated and supervised in their double handicap.
LANGUAGE DEVELOPMENT IN CHILDREN WITH PSYCHIATRIC IMPAIRMENT
LANGUAGE DEVELOPMENT IN CHILDREN WITH PSYCHIATRIC IMPAIRMENT

ACADEMISCH PROEFSCHRIFT

ter verkrijging van de graad van doctor
aan de Universiteit van Amsterdam
op gezag van de Rector Magnificus
prof. mr. P.F. van der Heijden
ten overstaan van een door het college voor promoties ingestelde
commissie, in het openbaar te verdedigen in de Aula der Universiteit
op 8 oktober 2003, te 10.30 uur en 11.30 uur

door

Claudia Johanna Karla Blankenstijn
geboren te Leiden

en door

Annette Roelien Scheper
geboren te Hengelo
Woord vooraf

Claudia Blankenstijn en Annette Scheper

Het schrijven van een wetenschappelijk proefschrift is geen koud kunstje. Het is een waar gevecht op de vierkante millimeter om je eigen ideeën en resultaten en die van anderen zo helder mogelijk op te schrijven zonder dat lezers afhaken bij de 67e tabel of figuur en stoppen met lezen. Velen uit Oegstgeest wisten dat wij gingen promoveren. Deze hechte, kleine gemeenschap heeft ons enorm gesteund door een niet aflopende belangstelling en blijk van waardering. Wij zouden in het bijzonder de Ouderraad van de GDT-school willen bedanken voor hun meelevens. Annemarie Krens was onvermoeibaar tijdens de fase van het drukklaar maken van het manuscript. Wij bedanken haar voor de goede lay-out adviezen en het bekijken van teksten op esthetische onvolkomenheden. Wij bedanken Bert Jan Kooij voor zijn hulp bij het leren converteren naar PDF. Eindelijk ligt het binnen ieders bereik om een kijkje in de keuken te nemen. Daarom bedanken wij ook alle anderen die de moeite nemen om dit werk te lezen, dat met volle overgave door ons is geschreven.

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onmogelijkheid hiervan is treffend door Pessoa verwoord:

"Wij weten zeer wel dat ieder werk noodzakelijkerwijs onvolmaakt is en dat de
minst zekere van onze esthetische beschouwingen die zal zijn van hetgeen we
opschrijven. Maar onvolmaakt is alles; er is geen zonsondergang zo mooi dat hij niet
nog mooier zou kunnen zijn, geen lichte bries die ons slaap geeft die ons niet een
nog rustiger slaap zou kunnen geven. En zo zullen wij, die bergen en standbeelden
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alles dromen, vooral met de intentie om het om te vormen tot onze innerlijke
substantie, tevens beschrijvingen en analyses vervaardigen die, eenmaal voltooid,
dingen zullen worden die vreemd voor ons zijn" (Nederlandse vertaling van een
passage van Femando Pessoa uit 'Het boek der rusteloosheid' (1990:8-9)).

Wetenschappelijk onderzoek is nooit volmaakt en altijd een momentopname. Toch
hoop ik dat dit werk een stukje meer helderheid heeft gebracht in de relatie van LI
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<tr>
<td>PMC</td>
<td>Product Moment Correlation Coefficient</td>
</tr>
<tr>
<td>MLU</td>
<td>Mean Length of Utterance</td>
</tr>
<tr>
<td>MLUL</td>
<td>Mean Length of 5 longest Utterances</td>
</tr>
<tr>
<td>GAP verbs</td>
<td>General All Purpose verbs</td>
</tr>
<tr>
<td>T-unit</td>
<td>Terminable Unit</td>
</tr>
<tr>
<td></td>
<td>main (or independent) clause with all its modifiers and subordinate clauses</td>
</tr>
<tr>
<td>Ø</td>
<td>Missing language element</td>
</tr>
<tr>
<td>PP</td>
<td>Prepositional Phrase</td>
</tr>
<tr>
<td>Adverb P</td>
<td>Adverb of Place</td>
</tr>
<tr>
<td>Adverb T</td>
<td>Adverb of Time</td>
</tr>
<tr>
<td>Adverb O</td>
<td>Adverb of Other type</td>
</tr>
<tr>
<td>S</td>
<td>Subject</td>
</tr>
<tr>
<td>O</td>
<td>Object</td>
</tr>
<tr>
<td>V</td>
<td>Verb</td>
</tr>
<tr>
<td>OI</td>
<td>Optional Infinitive stage</td>
</tr>
<tr>
<td>EOI</td>
<td>Extended Infinitive stage</td>
</tr>
<tr>
<td>INFL</td>
<td>Inflection</td>
</tr>
<tr>
<td>DET</td>
<td>Determiner</td>
</tr>
<tr>
<td>NUM</td>
<td>Numeral</td>
</tr>
<tr>
<td>A</td>
<td>Adjective</td>
</tr>
<tr>
<td>COMP</td>
<td>Complementizer</td>
</tr>
<tr>
<td>NEG</td>
<td>Negation</td>
</tr>
<tr>
<td>Verb Second</td>
<td>Occurrence of verb in second position of the sentence</td>
</tr>
<tr>
<td>DP</td>
<td>Determiner Phrase</td>
</tr>
<tr>
<td>NP</td>
<td>Noun Phrase</td>
</tr>
<tr>
<td>MLU</td>
<td>Mean Length of Utterance</td>
</tr>
<tr>
<td>MLUm</td>
<td>Mean Length of Utterance in morphemes</td>
</tr>
<tr>
<td>MLUw</td>
<td>Mean Length of Utterance in words</td>
</tr>
<tr>
<td>MLUL</td>
<td>Mean Length of 5 longest Utterances</td>
</tr>
<tr>
<td>MLULw</td>
<td>Mean Length of 5 longest Utterances in words</td>
</tr>
<tr>
<td>GAP verbs</td>
<td>General All Purpose verbs</td>
</tr>
</tbody>
</table>
**List of abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PP</td>
<td>Prepositional Phrase</td>
</tr>
<tr>
<td>GAO-unit</td>
<td>Goal-Action-Outcome Unit</td>
</tr>
<tr>
<td>INFL</td>
<td>Inflection</td>
</tr>
<tr>
<td>S</td>
<td>Speech time</td>
</tr>
<tr>
<td>R</td>
<td>Reference time</td>
</tr>
<tr>
<td>CC</td>
<td>Communicative contribution</td>
</tr>
<tr>
<td>T</td>
<td>Turn</td>
</tr>
<tr>
<td>LT</td>
<td>Long turn (&gt; 3 T-units)</td>
</tr>
<tr>
<td>MLT</td>
<td>Mean Length of Turns</td>
</tr>
<tr>
<td>LLT</td>
<td>Length of the Longest Turn</td>
</tr>
<tr>
<td>wh-question</td>
<td>Question that starts with where, when, who, why, etc.</td>
</tr>
<tr>
<td>alt-question</td>
<td>Alternative question</td>
</tr>
<tr>
<td>ACC</td>
<td>Assertive Communicative Contribution</td>
</tr>
<tr>
<td>NCC</td>
<td>Narrative Communicative Contribution</td>
</tr>
<tr>
<td>MS paraphrasis</td>
<td>Morphological/Syntactic Paraphrasis</td>
</tr>
<tr>
<td>SP paraphrasis</td>
<td>Semantic/Pragmatic Paraphrasis</td>
</tr>
<tr>
<td>NP</td>
<td>Noun Phrase</td>
</tr>
<tr>
<td>defNP</td>
<td>Definite NP</td>
</tr>
<tr>
<td>indefNP</td>
<td>Indefinite NP</td>
</tr>
<tr>
<td>S</td>
<td>Stereotypical opening/closing formula</td>
</tr>
<tr>
<td>D</td>
<td>Done expression</td>
</tr>
<tr>
<td>T</td>
<td>Tense</td>
</tr>
<tr>
<td>SA</td>
<td>Search Attempt</td>
</tr>
<tr>
<td>Loc</td>
<td>Location</td>
</tr>
<tr>
<td>Goal</td>
<td>Goal</td>
</tr>
<tr>
<td>Out</td>
<td>Outcome (result)</td>
</tr>
<tr>
<td>GAO-unit</td>
<td>Goal-Action-Outcome unit</td>
</tr>
<tr>
<td>Int responses</td>
<td>Internal responses</td>
</tr>
<tr>
<td>Plan Comp</td>
<td>Planning Components</td>
</tr>
<tr>
<td>C / con</td>
<td>Conversation</td>
</tr>
<tr>
<td>N / nar</td>
<td>Narrative</td>
</tr>
</tbody>
</table>
1 Language disorders and psychiatric disorders

Claudia Blankenstijn and Annette Schep

1.1 Introduction
In recent years there has been an increase in awareness that language disorders and psychiatric disorders frequently co-occur. In numerous studies it is assumed that these two areas of development are closely linked: language disordered children have a significantly increased risk of developing a psychiatric disorder, and conversely, children being treated for psychiatric disorders have a high prevalence of language disorders. Why this is the case and how these links should be interpreted, is still subject of research and debate. In this thesis we will study in depth the linguistic properties of the language produced by children with a psychiatric disorder. We will consider the structural properties of morphology/syntax and semantics/pragmatics of the children's language production. Thereafter we will explore the issue of the relationship between a specific linguistic profile and specific type of psychiatric disorder. An unresolved issue is whether psychiatric disorders are the cause or consequence of the language disorder, or whether they have both developed as a result of common third risk factors (see 2.2; 2.3.1) and are interrelated and comorbid from the beginning.

Although it is not the topic of this research to investigate the causal relationship between problems in language and social-cognition, this is an area that naturally needs to be discussed before preceding to the linguistic analysis. It is certainly plausible that the two areas of development mutually influence one another. From a psycholinguistic point of view, language is presumed to play a central role in social-cognitive development. Communicative language use is not only one of the most important tools to form social relationships with peers and caretakers, but also provides children with the most powerful means of causal thinking. They develop reasoning skills that enable them to differentiate emotional, behavioural and conceptual domains, gain mastery of these skills and refine them (Hassibi and Brewer, 1980; Bishop, 2002). Although not all language disordered children develop social-cognitive disorders, often referred to as psychiatric disorders (Van Leeuwen, Vieijra and Kappers, 1988; Prizant, Audet, Burke, Hummel, Maher and Theadore, 1990), it has been found that serious developmental language impairment can have a profound negative impact on social-cognitive development (Tallal, Dukette and Curtiss, 1989).

Language disorders might increase the risk for the development of psychiatric disorders or vice versa, resulting in a comorbidity. In this chapter, we will describe the possible complex relationship of this comorbidity and provide background information, such as working definitions of language and psychiatric disorder (1.2). Next, we will review the most important developmental literature concerning the co-occurrence of language and psychiatric disorders in different disordered populations.
(1.3). And finally, we will make some concluding remarks about this comorbidity in individuals (1.4).

1.2 The classification of language and psychiatric disorder

As is typical when different disciplines address similar research questions, studies of language and psychiatrically impaired populations not only use different theoretical frameworks and criteria for description of subject samples, but also different measures of the language and psychiatric disorder (Donahue, Hartas and Cole, 1999). We will show that co-occurrence rates depend on how language and psychiatric abilities are measured and described: the more precise the language and psychiatric assessment tools, the higher the co-occurrence rates. In some older studies, for example, children were solely diagnosed as being language disordered with respect to their cognitive functioning, namely if the verbal IQ was 15 to 20 IQ-points lower than the performal IQ. This procedure proved to be a rather poor indicator for the existence of language disorders (Cohen, Davine and Meloche-Kelly, 1989). Later, when linguistic abilities were tested, initially the areas of phonology, morphology, syntax and semantics (vocabulary) were investigated (Cantwell and Baker, 1987; Beitchman, Browning, Inglis, Wild, Mathews, Schachter, Kroll, Martin, Ferguson and Lancee, 1994; Beitchman, Wilson, Browning, Walters, Inglis and Lancee, 1996b) but no pragmatics. The research mentioned above used primarily standardized tests, probably resulting in lower co-occurrence rates than procedures that also included spontaneous language analysis. If more detailed assessment tools to analyse language abilities are used, such as (standardised) spontaneous language analysis, higher co-occurrence rates can be found (e.g. Ran and Smits, 1990).

Psychologists and psychiatrists are continually improving the tools to assess psychiatric disorders. The DSM-IV-TR (American Psychiatric Association, 2000) is a widely used diagnostic and statistical manual of mental disorders. Additionally, parental or teacher’s checklists, parental interviews and child observations can be used to motivate the psychiatric diagnosis (Lavigne, Gibbons, Kaufer-Christoffel, Arend, Rosenbaum, Biuss, Dawson, Sobel and Isaacs, 1996). In general, precise assessment procedures have a positive influence on the reliability of observed co-occurrence rates. However, psychiatric diagnosis often includes a language problem as part of the evidence for a psychiatric disorder, thus confounding the two (Grinnell, Scott-Hartnet and Glasier, 1983). In an attempt to differentiate both disorders, we will present some working definitions before we review the research results with respect to the co-occurrence of language and psychiatric impairment (see 1.3).

In this study, we use the terms disorder and impairment predominantly to describe a severely abnormal pattern of language and/or social-cognitive abilities in children causing distress or disadvantage to the individual and his environment. The term problem or difficulty is used when a less severe disorder or the existence of a possible disorder is inferred but has not yet been tested or diagnosed. Terms such as deficit, distortion, disturbance, disability, abnormality, anomaly and atypicality are
also frequently used in the literature to describe abnormal functioning (e.g. Cantwell and Baker, 1987), but will only occasionally be used in this text. It is important to remember that a disorder is not a stable collection of symptoms, but that a child can be disordered at different ages with quite different symptoms. Symptoms that identify the disorder are not static and change over time (Verhulst and Verheij, 2000; Rutter and Taylor, 2002). For efficiency, language impairment or language impaired children will be referred to as LI and LI-children, whereas psychiatric disorders and psychiatric disordered children will be termed PI and PI-children. The group of children with a language impairment (LI) and psychiatric impairment (PI) are further referred to as LIPI-children.

As a working definition of language disorder, we adopt the view that children must show comprehension and/or production impairments or deviant development in any or all of the subdomains in which language traditionally is divided: phonology, morphology, syntax, semantics and pragmatics. In these areas, many children with expressive language disorders have difficulties in receptive skills as well (APA, 2000:58-64). In normally developing English speaking children, 3% to 7% of all children are at risk to develop language impairment (LI) (Griffith and Ripich, 1999; Cantwell and Baker, 1991; Stevenson, 1984). In Dutch-speaking children, the rates are comparable: in 2.5% of all normally developing children at age 2;6 (De Koning, De Ridder, Van Agt, Van der Stege, Korfage, Polder, 2002) and in 5%-10% of older normally developing children a language disorder/delay is observed (Reep-van den Bergh, De Koning, De Ridder-Sluiter, Van der Lem and Van der Maas, 1998). The symptoms of the language disorder within and between subdomains, its manifestations and severity, and the effect on the child's overall functioning can change over time (Bloom and Lahey, 1978; Bishop, 1997).

In this thesis, language disorders are restricted to deficits in spoken language and do not include speech, although problems such as slow speech rate, intonation flattening and fluency disorders also might co-occur with certain psychiatric disorders, such as anxiety disorders (Kotsopoulos and Mellor, 1986). Although phonological disorders were evident in some of the 120 P-children in this study, we will not describe these in detail for reasons of time. Disorders of phonology, such as articulation difficulties (e.g. Fikkert, 1994; Beers, 1995), when they occur on their own, have in previous research been shown to have no or few psychiatric consequences (Baker and Cantwell, 1987ab; Howlin and Rutter, 1987; Beitchman et al., 1989a; 1996a, 1996b; APA, 2000:65-66; Toppelberg and Shapiro, 2000). However, since we know that phonological disorders can cause difficulties in the area of morphology/syntax and semantics/pragmatics, further investigations on this point are needed in the future. The other four language subdomains were grouped into morphology/syntax (MS) on the one hand and semantics/pragmatics (SP) on the other.
Many LI-labels have been proposed that cover a specific combination of LI-symptoms that also are related to certain more or less specific diagnostic groups, such as PI-children (Table 1.1).

**Table 1.1**  
LI terminology in order to classify different diagnostic groups

<table>
<thead>
<tr>
<th>Author</th>
<th>Label</th>
<th>Area of LI</th>
<th>Diagnostic group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bloom and Labey (1978)</td>
<td>Language Disorder (LD)</td>
<td>MS + SP</td>
<td>- N-children</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- PI-children</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- PHI-children*</td>
</tr>
<tr>
<td>Cantwell and Baker (1987)</td>
<td>Developmental Language Disorder (DLD)</td>
<td>MS + SP</td>
<td>- PI-children</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- PHI-children*</td>
</tr>
<tr>
<td>Morehead and Ingram (1973)</td>
<td>Specific Language Impairment (SLI)</td>
<td>MS</td>
<td>- N-children</td>
</tr>
<tr>
<td>Stark and Tallal (1981)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Van der Lely (1993, 2002)</td>
<td>Grammatical SLI (G-SLI)</td>
<td>MS</td>
<td>- N-children</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- PI-children with ADHD/PDD-NOS/</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>on autistic spectrum</td>
</tr>
<tr>
<td>Bishop and Rosenblum (1987)</td>
<td>Semantic-Pragmatic Disorder (SPD)</td>
<td>SP</td>
<td>- N-children</td>
</tr>
<tr>
<td>McTear and Conti-Ramsden (1992)</td>
<td></td>
<td></td>
<td>- PI-children with ADHD/PDD-NOS/</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>on autistic spectrum (Asperger)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bishop et al. (2000)</td>
<td>Pragmatic Disorder (PD)</td>
<td>P</td>
<td>- N-children</td>
</tr>
<tr>
<td></td>
<td>Pragmatic Language Impairment (PLI)</td>
<td></td>
<td>- PI-children with ADHD/PDD-NOS/</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>on autistic spectrum</td>
</tr>
</tbody>
</table>

* PHI-children: physically impaired children  
  (neurologic, senso-motoric, sensoric, and somatic impairments)  
** PIPHI-children: psychiatrically and physically impaired children
Language disorders and psychiatric disorders

From Table 1.1 we see that there are three main-streams in thinking about LI. First, there is the group of researchers that label LI-children in the most general terms (LD; LI; DLD) and include most diagnostic groups. Second, there are researchers, predominantly linguists that under the influence of Chomsky (1981) mainly have explored the morphosyntactic characteristics of LI. In Specific Language Impaired children (SLI-children) the emphasis has been on disorders in morphology and syntax (e.g. Rice, 1996; Leonard, 1998; De Jong, 1999). Specific Language Impairment (SLI) is the prevailing term in coexistence with Developmental Language Disorder (DLD) as used in DSM-IV-TR (APA, 2000) and ICD-10 (WHO, 1992). Van der Lely (e.g. 1993; 1994) also claims that a group of SLI-children exists who only have an impairment in grammar, called Grammatical SLI (G-SLI).

Third, there are researchers that mainly explore the semantic/pragmatic characteristics of LI under the heading of (Semantic-)Pragmatic Syndrome or Disorder. Semantic-pragmatic disorders have predominantly been observed in children with additional psychiatric disorders, especially disorders on the autistic spectrum (Bishop, 1997). However, in English (Cantwell and Baker, 1991; Beitchman et al., 1996b; Cohen, Menna et al., 1998) and Dutch psychiatrically disordered populations (Kolthoff, 1989; Ran and Smits, 1990; Polišenka, 2003) some children had exclusively semantic disorders. Our research best fits into the first main-stream, since we keep an open mind about the type of LI that PI-children may have.

In neuropathology, morphological/syntactic disorders seem to be more linked to left and semantic/pragmatic disorders to right hemisphere neurological dysfunctions (Shield, Varley, Broks and Simpson, 1996). In this research, we will group the domains in a similar way. Models of spontaneous language analysis with respect to morphology/syntax and semantics/pragmatics were primarily used to classify language disorders in these areas (see Chapter 3). We are aware of the fact that the language domains can be ordered in relation to each other in different ways. One such model takes morphology/syntax as the core encircled by semantics, seen as the interface of language and social-cognition. This is in turn interrelated and encircled by pragmatics at the interface of language and social-cognitive behaviour (e.g. Dik, 1989; Tager-Flusberg, 1992). Other models are presented in Chapter 2.

As a working definition, children who are to be classified as having a psychiatric disorder must show impairments or deviant development in social-cognition, especially in emotional/behavioural development. In order to diagnose psychiatric disorders, usually the DSM-IV-TR (APA, 2000) is used by psychiatrists, as opposed to the diagnosis of psychological disorders solely based on psychological testing. Aside from the term psychiatric disorders, some prefer 'emotional/behavioural disorders' (EBD) or only behavioural disorders (BD), used in the American-English literature to denote all types of psychopathology in children, such as emotional and emotional-behavioural disorders (ED/EBD).
Emotional and behavioural abilities that develop over time are usually called – when taken together – children's social development. Within social development different aspects can be accentuated. Some researchers highlight the development of emotions, thoughts, feelings and wishes etc. within a child, called the 'development of personality'.

Others see emotional development as a reciprocal system acquired in interaction, preferring the term 'emotional-social development'. If emotional/social development is assumed to be embedded in cognitive development, underlying mental representations of social interaction being necessary, then the term 'social-cognitive development' is to be preferred as the term for the general developmental area in which a childhood psychiatric disorder must be placed. This term will be used in this text, although the ideas scholars have about these different but overlapping major developmental areas leave the boundaries unclear.

A psychiatric disorder is equivalent to a social-cognitive disorder with a psychopathological basis. Furthermore, the psychiatric disorder, having characteristics that might change over time, has to be sufficiently severe and prolonged to the extent that it causes the child to be at some level of risk in one or more domains of life functions. The psychiatric disorder might cause significant distress or interfere with a child’s ability to study or to relate to family and friends, making the child and/or the people in his environment feel unhappy about the child’s functioning (Morrison and Anders, 1999).

It has been observed that 10% to 26% of normally developing English speaking children are at risk to develop a psychiatric disorder (Morrison and Anders, 1999; Lavigne et al., 1996). Lower rates are found for Dutch-speaking children: 7% of all children between 0;0 to 18;0 year develop a severe psychiatric disorder (De Koning et al., 2002).

There are a number of ways to categorise psychiatric disorders, although the different types of psychiatric disorders are generally diagnosed according to the ICD-10 (WHO, 1992) or the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) (APA, 2000). Both classification systems set out criteria for the diagnosis of different types of psychiatric disorder based on observations of symptoms in a child. The DSM-III-R and DSM-IV-TR is a multiaxial system that has been updated for over more than a hundred years. According to the DSM-III-R (APA, 1987) used during our investigation, it was possible to diagnose a psychiatric disorder on Axis I, such as Anxiety disorder, and other additional developmental disorders on Axis II, such as language disorders, or personality disorders. Physical disorders and other conditions, such as malnutrition, can be mentioned on Axis III. The severity of psychosocial stressors, such as child abuse or neglect, can be assessed on Axis IV. It is known that a multiaxial classification system such as the DSM provides a richer conceptualisation and higher reliability among diagnostic raters, because every axis must be coded, even if the coding is of 'no abnormality' (Rutter and Taylor, 2002). A global assessment of the child’s functioning at home and in school can be given on Axis V, containing information about the severity of
the psychiatric disorder, mostly based on the Children's Global Assessment Scale (C-Gas) (APA, 1994). Psychiatric disorders (Axis I) can be divided further into disorders having either an emotional or a behavioural basis (Griffith and Ripich, 2002:21). This division is adopted as the two global dimensions of psychopathology, often referred to as internalizing and externalizing psychiatric disorders (Mesman and Koot, 2002). Emotional disorders are seen as internalizing disorders, characterised by depressive, anxious, inhibited or withdrawn behaviour, resulting in a diminished interest and pleasure in activities (Rogers-Adkinson, 1999; Verhulst and Verheij, 2000), such as in Depressive Disorders (DSM-IV-TR, APA, 2000:369-381) and Anxiety Disorders (DSM-IV-TR, APA, 2000:121; 429-484). Behavioural disorders are characterised by externalizing abnormal behaviour, such as aggressive, antisocial, hyperactive and impulsive behaviour (Gresham, MacMillan and Bocian, 1996) as is observed in children with Attention Deficit Hyperactivity Disorder (ADHD) (DSM-IV-TR, APA, 2000:85-93) or Conduct, Oppositional and Disruptive Disorders (DSM-IV-TR, APA, 2000:93-103). Externalizing disorders are frequently perceived as disruptive, whereas internalizing disorders do not directly have such an effect. Diagnoses of behavioural/externalizing disorders and emotional/internalizing disorders are not necessarily mutually exclusive. For example, both types are to be found in the group of PI-children with PDD-NOS (DSM-IV-TR, APA, 2000:69-70) and of 'diagnostic orphans', PI-children who clearly have one or more severe emotional/behavioural psychiatric symptoms of the DSM-IV-TR, but do not meet the diagnostic criteria to be classified as a specific type. These children perceive the classification 'no diagnosis' (DSM-IV-TR, APA, 2000:743).

Dividing larger psychiatric populations into children with externalizing or internalizing disorders seems to be practically useful and also well motivated. Each group needs different assessment and treatment procedures (Verhulst and Verheij, 2000). Empirical data suggest that externalizing disorders are more common among boys and have an earlier onset time than internalizing disorders, which are more often found in girls (Cantwell and Baker, 1987; Morrison and Anders, 1999).

1.3 Co-occurrence rates of language and psychiatric disorders in development

A large number of children is found to have both language and emotional/behavioural disorders, although the co-occurrence rates in both populations show a huge variation across studies, namely from 37% to 89%. Children with language disorders have been found to have a high prevalence (37% to 89%) of diagnosable psychiatric disorders. Research in child psychiatry has demonstrated a high prevalence (46% to 59%) of language disorders. A high co-occurrence of language and psychiatric disorders is also found in pre-adolescents, students and adults (Donahue et al., 1999) and is especially associated with delinquency (Chess, 1944; Camp, Zimet, Van Doornick and Dahlem, 1977; Belenchia and Crowe, 1983; Warr-Leeper, Wright and Mack, 1994; Teichner, Golden, Crum, Azrin, Donahue and Van Hasselt, 2000). Here, we only include
literature on children younger than twelve years, since we are interested in the period in which the symptoms of both disorders become manifest for the first time (Cantwell and Baker, 1991). Furthermore, we only include those studies that are explicit about sample size, mean age, referral and assessment procedures and use appropriate selection criteria (explained below). If reports are based on subgroups out of the same total population, only the most recent publication is presented in the tables.

Symptoms of language disorder have frequently been used as criteria for diagnosing psychiatric disorders, for example, one of the diagnostic criteria for ADHD is 'often interrupts others/often blurts out answers before questions have been completed' (DSM-IV-TR, APA, 2000; see also Rogers-Adkinson, 1999:53). The language disorder is, however, never sufficient for such a diagnosis, although for some classifications, such as autism, it is a necessary condition. Statistics on the co-occurrence of language disorders and psychiatric disorders must reflect this confounding relationship by specifying whether children, in which both are necessary for a specific diagnosis, are included in the figures. However, in the past this has often not been done.

Prior to 1975, the comorbidity of both disorders was only studied in single cases or small groups. Language disordered children were often described as either shy, timid and over-anxious or tense, hostile and aggressive (Spock and Huschka, 1938; Karlin, 1954; Barbara, 1960; Schlangler, 1962). These children showed failures of individuation, such as distorted social perceptions, school phobias, and poor peer relations (Cantwell and Baker, 1977). These early studies will not be considered here.

Among the most famous landmark studies are the epidemiological studies of Beitchman and colleagues (Toronto, Canada; 1982-2003), the studies by Cantwell and Baker focussing on the prevalence of psychiatric disorders in language impaired children (Los Angeles; USA; 1977-1991), and the studies by Cohen and colleagues on the prevalence of language disorders in psychiatrically impaired children (Toronto, Canada; 1985-2003). These different types of studies have been carried out since the early eighties, including some follow-up studies. The last two types of study will be discussed in the most detail, since the existence of possible language disorders is tested thoroughly.

1.3.1 Epidemiological studies
In epidemiological studies children are selected at random from the total population of children and diagnosed as being language and/or psychiatrically disordered. These studies explore developmental abilities in large populations, including children attending kindergarten or main stream schools. However, the different designs that have been chosen make it quite difficult to compare the results of these studies.

One of the earlier studies is that of Stevenson and Richman (1978) (Table 1.2). They explored the co-occurrence of language and psychiatric disorders in 705 three-year-olds in an aselect population in England. The following results are reported based on first screening: 84% (n=595) were not disordered, 13% (n=88) were psychiatrically disordered, whereas only 3% (n=22) were language disordered. The low prevalence
of language disorders in the total population is probably caused by the method of testing, as the diagnosis was only based on scores of a general expressive language test. After more detailed testing only 2% (n=13) of all 88 PI-children suffered from both language and psychiatric disorder. When calculated over all 22 language disordered children, out of this group 59% (n=13) also had a behavioural disorder (PI). The existence of a psychiatric disorder was only established by means of parental checklists and interviews about behavioural development. The results should be interpreted with caution, since the diagnosis of both disorders is based on procedures that are not detailed enough.

Beitchman, Peterson and Clegg (1988) assessed language and psychiatric disorders in 1655 five-year-old Kindergarten children in Canada; 50% of the LI-children (n=142) proved to suffer also from psychiatric disorder, primarily related to attention deficits. Unfortunately, they do not report the percentage of children with only a PI. In these two epidemiological studies, the approximate co-occurrence rates for psychiatric disorder in LI-children vary from 50% to 60%. Children in which both disorders co-occurred were observed to have more severe language-processing problems as well as greater delays in language skills than language impaired peers without psychiatric impairment.

Table 1.2  The co-occurrence of language impairment (LI) and psychiatric impairment (PI) in epidemiological studies

<table>
<thead>
<tr>
<th>Authors</th>
<th>Sample</th>
<th>Mean Age</th>
<th>Population</th>
<th>Assessment LI</th>
<th>Assessment PI</th>
<th>% PI in LI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stevenson and Richman (1978)</td>
<td>705 English-speaking</td>
<td>3;0</td>
<td>Aselect</td>
<td>expressive language test</td>
<td>checklist parents interview parents</td>
<td>59% PI in 22 LI-children</td>
</tr>
<tr>
<td>Beitchman et al. (1988)</td>
<td>1655 English-speaking</td>
<td>5;0</td>
<td>Kindergarten</td>
<td>language test: phonology semantics syntax</td>
<td>interview parents checklist parents checklist teachers DSM-III</td>
<td>50% PI in 142 LI-children</td>
</tr>
</tbody>
</table>

1.3.2 The comorbidity of psychiatric disorders in language impaired children

Unlike epidemiological studies, other comorbidity studies have begun by selecting a population of LI-children, recruiting children from (private) language clinics. Psychiatric disorders are not uncommon in children referred to language services, although some children's psychiatric impairments remain unsuspected until detailed
testing is done. Only the best-known and most appropriately designed developmental studies on this issue will be presented (see Table 1.3). From Table 1.3, it is clear that research differs in sample size, age groups and assessment procedures, making results difficult to compare. Sometimes results with respect to co-occurrence rates are disputable, since selection criteria were not appropriately defined. For example, Paul, Cohen and Caparulo (1983), who reported that 61% of 28 LI-children showed psychiatric disorders, included children that could not be IQ-tested or frequently had seizures; 50% of these children were severely language impaired since they had little to no useful language.

The first classic investigations assessed psychiatric disorders in 600 children who had been referred to speech and hearing clinics (Baker and Cantwell, 1987a, 1987b; Cantwell and Baker, 1987). Mostly, a speech and hearing clinic is specialized in the assessment and treatment of children with language disorders, including phonological (articulation) and hearing difficulties. Baker and Cantwell have reported about different subgroups of approximately 100, 200 or 300 children out of this large group (n=600), varying in age from 2;0 - 16;0 years (mean age 5;6 years) (e.g. Cantwell and Baker, 1985). The enormous variability in the children's age influences the prevalence of specific types of psychiatric disorders, since some might be more prevalent in older age groups (Cantwell and Baker, 1987; Rutter and Taylor, 2002).

Table 1.3 The co-occurrence of psychiatric impairment (PI) in children with language impairment (LI-children) from previous research

<table>
<thead>
<tr>
<th>Authors</th>
<th>Sample</th>
<th>Mean Age</th>
<th>Population</th>
<th>Assessment LI</th>
<th>Assessment PI</th>
<th>% PI in LI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amarosa et al. (1986)</td>
<td>24</td>
<td>4;5 - 8;0</td>
<td>Speech/</td>
<td>phonology/</td>
<td>neurological</td>
<td>37% PI in LI-children</td>
</tr>
<tr>
<td></td>
<td>English-speaking</td>
<td></td>
<td>Hearing Clinic</td>
<td>IQ test</td>
<td>ICD-10</td>
<td></td>
</tr>
<tr>
<td>Cantwell and Baker (1987)</td>
<td>600</td>
<td>5;6</td>
<td>Speech/</td>
<td>auditory test</td>
<td>checklist teachers</td>
<td>73% PI in LI-children</td>
</tr>
<tr>
<td>Baker and Cantwell (1987a,b)</td>
<td></td>
<td></td>
<td>Hearing Clinic</td>
<td>language test</td>
<td>checklist parents</td>
<td></td>
</tr>
<tr>
<td>Tallal, Dukette and Curtiss (1989)</td>
<td>80</td>
<td>4;3</td>
<td>Speech/</td>
<td>auditory test</td>
<td>checklist parents</td>
<td>89% PI in LI-children</td>
</tr>
<tr>
<td></td>
<td>English-speaking</td>
<td></td>
<td>Hearing Clinic</td>
<td>language test:</td>
<td>(CBCL)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>phonology</td>
<td>morphosyntax</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>semantics</td>
<td>pragmatics</td>
<td></td>
</tr>
</tbody>
</table>
In their studies, language disorders are thoroughly analysed. Different tests were used to establish auditory, articulatory, and receptive/expansive language abilities. Sometimes even an analysis of spontaneous language was part of the language assessment procedure (Cantwell, Baker and Rutter, 1978; Mattison, Cantwell, and Baker, 1980). They established three subgroups in their LI-population: (1) children with exclusively speech disorders, (2) children with exclusively language disorders and (3) children with both speech- and language disorders. They also used the most refined diagnostic psychiatric instruments available. In the most complete study including the largest population, it is reported that more than 50% of all 600 LI-children were diagnosed as having a psychiatric disorder: 31% of the speech disordered children (n=203), 73% of the language disordered (n=45) and 58% of the speech/language disordered children (n=352) proved to have an additional psychiatric disorder (Baker and Cantwell, 1987). The highest co-occurrence rates were observed in the exclusively language disordered subgroup. The most frequently observed psychiatric disorders in LI-children were Attention Deficit Disorder, Oppositional Disorder and Anxiety Disorder (Cantwell and Baker, 1980; Baker and Cantwell, 1982, 1987).

The major weakness of these studies is that they included language disordered autistic children. Although this group was small, their inclusion might have increased the reported co-occurrence rates, since the language disorder is a necessary condition for such a psychiatric diagnosis. Cantwell and Baker should have excluded these autistic children in advance. Another point of criticism is that they included mentally retarded children. For example, in Baker and Cantwell (1987), mental retardation (IQ measure below 70) was observed in 6% of all children. Their inclusion also might have increased the reported co-occurrence rates. Low IQ rates can reflect information processing disorders possibly based on underlying neurodevelopmental immaturity that might cause both LI and PI in individual children (Beitchman et al., 1996b) (see 2.2 and 2.3.1). However, the major strength of these studies is that they collected one of the largest samples and used the most refined diagnostic language and psychiatric instruments available at the time, treating both disorders as being of equal importance.

Other studies have shown a design more or less comparable to Baker and Cantwell’s, but applied stricter criteria for subject samples. Amarosa, Von Benda and Wagner (1986) found that 37% of language impaired, but not cognitively impaired children (n=24) had additional psychiatric disorders, characterized by hyperactivity and attention deficits. Although Tallal, Dukette and Curtiss (1989) carefully selected their population, they were less careful in diagnosing the psychiatric disorder, since diagnoses were solely based on parental rating scales. They reported that 89% of all 80 LI-children selected from schools/clinics were judged by their parents as having psychiatric problems, especially attention deficits.

In sum, the results from the different developmental studies confirm that LI-children have a relatively high prevalence (37% to 89%) of psychiatric disorder. It is important to note that the language disorders were especially related to attention deficits in these studies. This was also found in the epidemiological study of
Beitchman and colleagues. They postulated that neurodevelopmental immaturity may be the common underlying antecedent of both linguistic and psychiatric impairment, especially in children with AD(H)D (Beitchman et al., 1994, 1996a, 1996b). This view will be discussed in more detail in Chapter 2.

1.3.3 The comorbidity of language disorders in psychiatrically impaired children

Some comorbidity studies select a population of PI-children, recruiting children from psychiatric clinics or those referred for psychiatric services to mental health centers. Again, the comorbidity rates reported in these different studies are highly variable, ranging from 46% to 86%. Before the most appropriately designed developmental studies of this type will be presented (Table 1.4), we will briefly explain why other studies are not included.

We have excluded, for example, one well-known study of Chess and Rosenberg (1974) who found language disorders in 24% of all 563 PI-children (age 2;0 to 16;0 years) with predominantly Attention Deficit Disorders. Half of these LIPI-children showed some form of mental retardation, causing a higher percentage of both LI and PI (see 2.2 and 2.3.1). Multilingual children were also included in this study, which may have negatively influenced the assessment of language skills, resulting in a higher percentage of LI. Although on the basis of subject sampling high co-occurrence rate were expected, Chess and Rosenberg (1974) reported an extremely low co-occurrence rate. This may be due to the fact that children with exclusively articulatory disabilities were classified as LI. Articulation disorders co-occur less frequently with psychiatric disorders than morphological/syntactic and semantic/pragmatic language disorders (Baker and Cantwell, 1987; Love and Thompson, 1988; see 2.2.1). Two other studies had to be excluded from detailed description for comparable reasons. Gualtieri, Koriath, Van Bourgondien and Saleeby (1983) who reported language disorders in 77% of 26 PI-children (mean age 9;4) also wrongly included mentally retarded children, as the mean IQ of the LIPI-children was below 80. Love and Thompson (1988) found language disorders in 59% of 116 PI-children (mean age 5;0) with predominantly Attention Deficit Disorder. This study was also not representative, because they included many bilingual and multilingual children.
Table 1.4 The co-occurrence of language impairment (LI) in children with psychiatric impairment (PI-children) from previous research

<table>
<thead>
<tr>
<th>Authors</th>
<th>Sample</th>
<th>Age range</th>
<th>Population</th>
<th>Assessment LI</th>
<th>Assessment PI</th>
<th>% LI in PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Van Leeuwen, Viejra and Kappers (1988)</td>
<td>71 Dutch-speaking</td>
<td>4.0-13.0</td>
<td>Peadological Institute</td>
<td>auditory test language test (TvK): rec./expr language judgement IQ test</td>
<td>psychiatric research</td>
<td>60% LI in PI-children</td>
</tr>
<tr>
<td>Kolthoff (1989)</td>
<td>6 Dutch-speaking</td>
<td>5.10-7.11</td>
<td>Child Psychiatry Clinic</td>
<td>language test: (TvK) rec./expr language analysis (STAP) IQ test</td>
<td>interview parents interview child DSM-III-R</td>
<td>86% LI in PI-children</td>
</tr>
<tr>
<td>Ran and Smits, (1990)</td>
<td>16 Dutch-speaking</td>
<td>5.2-8.9</td>
<td>Child Psychiatry Clinic</td>
<td>language test (TvK): rec./expr. language analysis (STAP) IQ test</td>
<td>interview parents interview child DSM-III-R</td>
<td>75% LI in PI-children</td>
</tr>
</tbody>
</table>
The Dutch studies and English studies of Cohen and colleagues (Table 1.4) were all based on better research designs, as autistic, mentally retarded and multilingual children were excluded. The Dutch study of Van Leeuwen et al. (1988) reported language disorders in 60% of 71 PI-children. The criteria used to define LI and PI were, however, not clearly specified. Language disorders were more precisely diagnosed in two small Dutch studies (Kolthoff, 1989; Ran and Smits, 1990), which served as pilot studies for this current research. They both used a language test (Taaltest voor Kinderen (TvK); Van Bon and Hoekstra, 1982) and analysed conversational abilities, according to a spontaneous language analysis procedure (STAP) (Van den Dungen and Verbeek, 1994, 1999) (see 3.4).

On the basis of psychiatric parental/child interviews and psychological testing, children were diagnosed according to the DSM-III-R (see 3.2.2). These studies were the first to present more specific information about the type of language disorders observed in PI-children. This detailed language analysis might account for the high co-occurrence rates reported in both studies: the more precisely symptoms of a language disorder are defined, the more children with language disorders are detected, resulting in higher co-occurrence rates. Kolthoff (1989) found one PI-child with LI exclusively in the area of morphology/syntax, another PI-child with LI exclusively in the area of semantics, while three PI-children with LI were diagnosed as semantic/pragmatic disordered. Ran and Smits (1990) observed more or less the same distribution of the different types of language disorders. These studies base their results on very small subject samples, so that these high co-occurrence rates are not generalizable.

In the English study of Cohen and colleagues (1989) 46% of the 37 PI-children suffered from LI. In a later study of Cohen and colleagues (Cohen, Davine, Horodezky, Lipsett and Isaacson, 1993), they observed language disorders in 52% of the 399 PI-children (age 4;0 to 12;0 years). The latest study reports language disorders in 63% of all 380 PI-children (age 7;0 to 14;0 years) (Cohen, Barwick, Horodezky, Vallance and Im, 1998; Cohen, Menna, Vallance, Barwick, Im and Horodezky, 1998).

Over time, the reported co-occurrence rates have increased, since the LI-diagnosis is no longer solely based on receptive/expressive language tests as in the earliest study, but also on spontaneous conversational and narrative analyses in both morphological/syntactic and semantic/pragmatic areas. New to their design was that they divided the children that suffered from both language and psychiatric disorder into two groups: group 1 LIPI-children that have obvious language disorders before they were first seen for language assessment and group 2 LIPI-children in which the language disorder was detected only after thorough language testing.

In all of these studies mentioned above, Cohen and colleagues observed that half of the LIPI-children had previously identified language disorders (group 1) and half had unsuspected language impairments (group 2). Group 1 LIPI-children were initially thought to have more severe problems in formulating grammatically correct sentences, whereas group 2 LIPI-children had more semantic-pragmatic disorders (Cohen et al., 1993; Cohen, Menna et al., 1998; Cohen, Barwick et al., 1998). Initially, the unsuspected language impairments (group 2) were predominantly
observed in children with ADHD. It was thought that the language impairments in these children had been overlooked for such a long period because the symptoms of the psychiatric disorder overshadowed the language difficulties (Cohen et al., 1989). As their research developed, they have argued that unsuspected language impairments, mainly semantic-pragmatic disorders, were in general more difficult to detect than morphological/syntactic disorders, because semantic/pragmatic disorders easily (but wrongly) were confused by adults with symptoms of a psychiatric disorder, such as inattentiveness or noncompliance (Howlin and Rutter, 1987; Cohen et al., 1993). They conclude that semantic-pragmatic disorders are often overlooked in the period before assessment by parents, teachers and clinicians.

Recently, Cohen and colleagues have observed that the language impairments in the area of morphology/syntax and semantics/pragmatics in children with ADHD do not differ from the language impairments observed in children with other psychiatric disorders, such as Oppositional Conduct Disorder or Overanxious Disorder (Cohen, Vallance, Barwick, Im, Menna, Horodezky and Isaacson, 2000). Cohen and colleagues have found no support for the hypothesis that specific psychiatric disorders are associated with specific morphological/syntactic or semantic/pragmatic disorders, nor with respect to the severity of language disorder (Cohen et al., 1993; Cohen, Menna et al., 1998; Cohen, Barwick et al., 1998; Cohen et al., 2000) nor with respect to receptive as opposed to expressive language disabilities. These results are comparable to earlier findings reported by others (Beitchman, 1985; Beitchman and Young, 1997).

The major strength of the Cohen studies is that they have used the most refined diagnostic language instruments available. However, as the psychiatric diagnosis was mainly established on the basis of (parental) checklists or reports about behaviour development, this has reduced the likelihood of obtaining information on internalizing disorders, such as Depression, which typically comes from children's self-reports, as the researchers themselves admit (Cohen et al., 2000).

In sum, the results from the different developmental studies confirm that PI-children have a relatively high co-occurrence (46% to 86%) of language disorder. This is more or less comparable to the co-occurrence of psychiatric disorder (37% to 89%) found in LI-children. The variation is mainly due to differences in subject selection and accuracy of assessment procedures. We conclude that a clear correlation between specific type of language disorder and specific type of psychiatric disorder has not yet been found. For example, no specific language disability profile can be associated with ADHD as opposed to what has been claimed and still is claimed, for example, in the DSM-IV-TR (APA, 2000). It is clear that research that disentangles symptoms of language impairment from symptoms of psychiatric impairment is still needed.
1.3.4 Co-occurrence rates at follow-up

The studies discussed above have focussed on assessment at one point in time. However, the comorbidity of LI and PI can change over time in the same individual as described in follow-up studies. Although some children do not improve, despite any form of professional help, other children improve their language and/or social-cognitive skills over time, as a result of therapy. One disorder disappears, causing a decrease in co-occurrence rates.

In practice some older LI- or PI-children are wrongly diagnosed as having a learning disorder instead of being diagnosed as LI or PI. Learning disorders are mostly reflected by poor academic achievements in the area of reading, spelling and mathematics (Beitchman et al., 1994; Cantwell and Baker, 1991; Cohen, Menna et al., 1998; Griffith and Riepe, 1999; Tomblin, Zhang, Buckwalter and Catts, 2000; APA, 2000:49-56).

This wrong diagnosis might be another reason for observing lower co-occurrence rates at follow-up, as this reduces the chance to identify LIPI-children. Consequently, the identification of a clear causal relationship between LI and PI in time is not possible. In the future, learning disorders should be separated from language and/or psychiatric disorders in order to get better subject samples necessary for observing more reliable co-occurrence rates over time (Baker and Cantwell, 1982b, 1987a; Prizant et al., 1990; Cantwell and Baker, 1991; Whitehurst and Fischel, 1994).

Despite this difficulty in diagnosing LI or PI in school-aged children, some researchers were able to select appropriate subject samples. In one follow-up study it is reported that only 26% of all five-year-old PI-children developed LI at twelve years of age (Beitchman et al., 1996a, 1996b). Most research in this area shows that a substantial part (33% to 73%) of all LI-children develop additional psychiatric disorders (PI) over time. The causal relationship between LI and PI in general was first observed by Sheridan (1973) and Sheridan and Peckham (1975). Associations between early language disorders and later antisocial behavioural disorders have also been found (for an overview see Donahue, Hartas and Cole, 1999:80-85). They found that the chance that seven-year-old LI-children develop psychiatric disorders at age eleven is three to four times higher than in seven-year-old non-language disordered children. Fundudis, Kolvin and Garside (1980) found that 77% of 133 three-year-old LI-children developed a psychiatric disorder at age seven. Stevenson, Richman and Graham (1985) observed that 38% of 256 three-year-old LI-children developed additional psychiatric impairments at age eight. In a longitudinal study Silva and colleagues (Silva, Justin, McGee and Williams, 1984; Silva, Williams and McGee, 1987) documented that three-year-old LI-children had more parent and teacher-reported externalizing psychiatric disorders at age nine and eleven. In later reports of the Beitchman follow-up study, PI-children with early language impairment at age five were found to have significantly higher rates of Anxiety Disorder at age nineteen compared to non-language-impaired PI-children (Beitchman, Wilson, Johnson, Atkinson, Young, Adlaf, Escobar and Douglas, 2001).

Some researchers, for example Cantwell and Baker (1.3.2) and Beitchman and colleagues (1.3.1) extended their original design following up same populations.
Baker and Cantwell (1987a) reported that 16% of all 300 five-year-old LI-children developed psychiatric impairments at age nine, such as ADHD and Anxiety Disorder. Beitchman and colleagues reported that 33% of the 215 five-year-old LI-children developed an additional psychiatric disorder at twelve years (Beitchman et al., 1996a, 1996b); these were mainly externalizing psychiatric impairments (Table 1.5).

Table 1.5 Follow-up studies: proportion of language impaired children (LI-children) that developed a psychiatric impairment (PI) at time 2 (follow-up) from previous research

<table>
<thead>
<tr>
<th>Authors</th>
<th>Sample</th>
<th>Mean Age</th>
<th>Population</th>
<th>Assessment LI</th>
<th>Assessment PI</th>
<th>% LI-children developed PI at time 2 (follow-up)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cantwell and Baker (1987a)</td>
<td>300 English-speaking</td>
<td>time 1 5; 6, time 2 9; 1</td>
<td>Speech/Hearing Clinic</td>
<td>auditive test language test: (rec./expr.) language analysis IQ test t2</td>
<td>checklist teachers, checklist parents interview parents interview child DSM-III</td>
<td>16% LI-children developed PI</td>
</tr>
<tr>
<td>Cantwell, Baker, Rutter and Mawhood (1989)</td>
<td>14 English-speaking</td>
<td>time 1 8; 0, time 2 11; 0</td>
<td>Speech/Hearing Clinic</td>
<td>auditive test language test (rec./expr.) language analysis IQ test t2</td>
<td>interview parents</td>
<td>9% LI-children developed PI</td>
</tr>
<tr>
<td>Beitchman et al. (1996) Beitchman et al. (2001)</td>
<td>215 English-speaking</td>
<td>time 1 5; 0, time 2 12;5, time 3 19;5</td>
<td>Main school language test: phonology semantics syntax</td>
<td>checklist teachers, checklist parents interview parents child checklist DSM-III-R</td>
<td>checklist teachers, checklist parents interview parents interview child DSM-III-R</td>
<td>33% LI-children developed PI</td>
</tr>
</tbody>
</table>

Some researchers explain this increase in comorbidity rates over time by assuming that psychiatric disorder already existed but remained undetected. They argue that at follow-up the language disturbance might be experienced as less severe, due to the adult's improved coping behaviour, i.e. responding more sensitively to the language disordered child. The previously undetected symptoms of a psychiatric disorder become therefore suddenly highlighted (Bishop and Edmundson, 1987; Beitchman et al., 1996a, 1996b). It is assumed that symptoms of psychiatric impairment existed but were not identified. However, this does not explain their co-existence. Researchers still need to explain how the language impairments in LI-children (without psychiatric disorder) at time 1 might cause additional psychiatric impairments at time 2 (LI -> PI), diagnosed at follow up (time 2) as LIPI-children. The lack of understanding of the child's specific types of language problems can cause
difficulties for the child in that communication will be disrupted, causing frustra­tions and then psychiatric problems (Cohen et al., 1989). How linguistic and social­cognitive theories might contribute to the explanation of this specific causal relationship between LI and PI will be discussed in more detail in Chapter 2. Alternative causal relationships will also be described.

1.4 General conclusions and additional remarks
After reviewing the developmental literature, we see that differences in diagnostic standards and the nature of sampling contributed to the variation in co-occurrence rates (33% - 89%), although most results indicate a clear co-occurrence of LI and PI:

- PI was found in 50% - 59% of all LI-children (Epidemiological studies)
- PI was found in 37% - 89% of all LI-children (Speech/Hearing Clinic)
- LI was observed in 46% - 86% of all PI-children (Child Psychiatry Clinic)
- PI was observed in 33% - 73% of all LI-children (Follow-up studies)

Thus, despite all differences in research design, we can conclude that psychiatric disorders are as common in populations of language disordered children as, conversely, language disorders are in populations of psychiatric disordered children. We showed that when language abilities are only globally measured, co-occurrence rates are approximately 50%, whereas more detailed testing result in co-occurrence rates even higher than 80%. We also showed that language disordered children are at risk for developing a psychiatric disorder that is approximately 4.5 times higher than that of non-language impaired children. The severity of the language impairment might even increase this risk (Beitchman et al., 1989b, 1990). LI-children, in which both disorders co-occur, were observed to have more severe language-processing problems as well as greater delays in language skills than language impaired peers without psychiatric impairment (Baker and Cantwell, 1987). In these children, life-functioning in school and at home is often severely disturbed over a longer period of time (Baker and Cantwell, 1982; Beitchman et al., 1996). Thus, symptoms of a language disorder must be thoroughly assessed and separated from symptoms of a psychiatric disorder, especially where the LI-symptoms are a necessary condition of diagnosing the psychiatric disorder. We also explained why LI and PI should be disentangled from learning disorders. This thesis will empirically address the comorbidity issue by attempting to give detailed descriptions of the language problems of PI-children. In the developmental literature about the comorbidity of language and psychiatric disorders relatively little attention has been paid to the matter of causality. In Chapter 2 we will discuss and explain the co-occurrence of language and psychiatric disorder from different theoretical perspectives.
2 The causality of comorbidity

Claudia Blankenstijn and Annette Scheper

2.1 Introduction
As described in Chapter 1, a comorbid relationship between language and psychiatric disabilities exists so frequently that the co-occurrence of these impairments cannot be a chance occurrence; it seems to be a systematic pattern that theories of development have to account for. In every-day interaction, however, the relationship between symptoms of LI and PI might be difficult to establish. The symptoms of a language impairment (LI) and a psychiatric impairment (PI) can appear very close to one another in time (Example 1).

Example 1  Symptoms of language and psychiatric disorders in a short conversation (Donahue et al., 1999:77; published with permission of Donahue)

William:  They never let me have the ball. I HATE THEM!
Teacher: (calmly mirroring his statement) You do?
William: (yelling) Don't you call me a DOO!

It can be seen in Example 1 that children's emotional/behavioural disorders can easily lead to a breakdown in linguistic communicative interaction on the one hand, whereas on the other hand their language disorders can lead to miscommunication causing feelings of frustration.

The two problems are so interwoven that it is difficult to establish the causal relationship between the two. It is not difficult to imagine that the complexity of this relationship has made it difficult to develop adequate 'models of analysis' that separate LI from PI symptoms. Such a model should be based on linguistic and social-cognitive developmental theories that explicitly account for the relationship between LI and PI. Such a theory should provide a complete and coherent developmental framework including atypical development (Bishop, 1997) and explaining the relatively high co-occurrence of LI and PI. There is no current theory that makes explicit claims about the comorbidity issue; clearly this is a gap.

Since the comorbidity of both disorders is an empirical central issue in this thesis, we need to look for starting points in some developmental theories in order to infer some possible explanations for the co-occurrence of LI and PI. Three possible causal relationships between LI and PI will be put forward and explained in 2.2. Next, we will describe how different developmental theories are thought to explain one or more of these basic causal relationships in 2.3. It should become clear which theories contribute more to the comorbidity issue than others, as presented in 2.4. Finally, in 2.5, we will formulate the main research questions.
2.2 Causal relationships of comorbidity

In empirical research involving large groups of language disordered psychiatrically impaired children (LIPI-children) (see 1.3), three basic causal relationships are most frequently used to explain the comorbidity (see Table 2.1).

**Table 2.1 Three causal relationships of comorbidity**  
*(LI=Language Impairment; PI = Psychiatric Impairment)*

<table>
<thead>
<tr>
<th>Causal relationships</th>
<th>Time 1</th>
<th>Time 2</th>
<th>Time 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PI → LI</td>
<td>(Third risk factors →)</td>
<td>PI →</td>
<td>PI + LI</td>
</tr>
<tr>
<td>2. LI → PI</td>
<td>(Third risk factors →)</td>
<td>LI →</td>
<td>LI + PI</td>
</tr>
<tr>
<td>3. LI ↔ PI</td>
<td>(Third risk factor →)</td>
<td>(LI ↔ PI)</td>
<td></td>
</tr>
</tbody>
</table>

The psychiatric disorder may cause the language disorder resulting in the comorbid existence of PI and LI (Causal relationship 1) or the language disorder may cause the psychiatric disorder resulting in the comorbid existence of LI and PI (Causal relationship 2). Language disorders and psychiatric disorders can also be seen as standing side by side and interacting, whereby cause and effect between the two disorders are not clear; this results in a dependent comorbid existence (LI ↔ PI) from the start (Causal relationship 3) (Cantwell and Baker, 1985; Yule and Rutter, 1987; Prizant et al., 1990; Melamed and Wozniak, 1999; Westby, 1999).

In our attempt to describe these different relationships (Table 2.1), we have separated language impairments (LI) from psychiatric impairments (PI). We make no assumption about the importance of the one in relation to the other. Furthermore, in order to get insight in the etiology, the emergence of the disorders is extrapolated on an abstract time scale. Time 1 refers to the initial stage before the emergence of a disorder. At this point in time one or more third risk factors might increase the chance for a child to develop the one or other disorder. In Table 2.1, these risk factors are placed between brackets, because they are not always detectable (due to insufficient assessment procedures) or they have not yet been detected (due to lack of time and resources). Some of the theories we will discuss include third risk factors in their explanation of the emergence of one or both disorders, while others do not. Time 2 refers to the emergence of one of the two disorders we are focussing on or both. At Time 3 the other disorder appears as a result of the first, resulting in the comorbidity of both disorders in the end. Causal relationship 3 differs from 1 and 2 in that no unicausal direction relationship exists between LI and PI. Within causal relationship 3 LI and PI are seen as standing side by side and interacting, whereby cause and effect are not clear. They have a mutual influence due to multiple interconnected causal processes (Cohen et al., 1998a; Prizant, 1999). In
consequence, both disorders are assumed to start to develop more or less at the same time (Prutting and Kirchner, 1983; Yule and Rutter, 1987; Crittenden, 1996).

**Third risk factors**

Here we will briefly describe possible third risk factors, making a distinction between factors within the child and factors related to the environment. Factors within the child are sex and temperament of child, genetic abnormalities and neurological disorders; factors related to the environment are psycho-social stress factors. On the basis of research in this area, it has been claimed that only a combination of third risk factors will lead to the emergence of LI and PI (Bishop, 1997); no single factor will be sufficient.

From the developmental literature, it is known that a higher occurrence of language as well as psychiatric disorders is found in boys than in girls (Morrison and Anders, 1999; DSM-IV-TR, APA, 2000; Rutter and Taylor, 2002). This may well be related to genetic abnormality and environmental factors. Recently, a different developmental pattern was described for girls as opposed to boys: with age the psychiatric disorders decrease relatively more quickly in girls than in boys. Furthermore, aggressive behaviour in two-year-old boys proved to be a predictor for later externalizing disorders as opposed to girls in which aggressive behaviour at an early age proved to be a factor that can protect these girls for developing internalizing disorders (Mesman and Koot, 2002).

The child's temperament might intensify or mitigate the effects of language and psychiatric deficits (Mesman and Koot, 2002). For example, introversion might be negatively related to initiative-response patterns in communicative interaction and shyness might be related to anxiety disorders (Van Leeuwen et al., 1988; Lavigne et al., 1996).

A genetic abnormality may diminish the functional capacities that underlie linguistic and other social-cognitive processes, which in turn might cause a child to develop LI or PI or both (Tannock, 1998; Donahue et al., 1999; Griffith and Ripich, 1999; Melamed and Wozniak, 1999; Prizant, 1999). Genetic abnormalities can be located on different loci on certain genetic strings in the human DNA, for example the recently located 'FoxP2 language gene' (Kai, Fisher, Hurst and Vargha-Khadem, 2001; see for a critical discussion: Vargha-Khadem, Watkins, Alcock, Fletcher and Passingham, 1995). A genetic factor might underlie all language disorders in general (Gopnik and Crago, 1991; Rice, 1996; De Jong, 1999; APA, 2000:58-64; Bishop, 2001), or be specifically responsible for the specific language disorders found in SLI-children (Van der Lely, 1993, 2002). Until now, language disorders have not shown such a clear familial aggregation as some specific psychiatric disorders. The following psychiatric disorders are said to show a substantial family loading: schizophrenia, autism, emotional disorders (depression and general anxiety) and behavioural disorders (oppositional/defiant or conduct disorder) (Rutter and Taylor, 2002). Although familial aggregation suggests that a genetic factor increases the risk of language and social-cognitive impairment, the genes responsible for these impairments still have to be located.
Neurological disorders are often viewed as the underlying cause for sensory integration disorders (e.g. Ayres, 1979) and more general information processing disorders that increase children's chance to develop LI or PI or both (Cantwell and Baker, 1991; Bishop, 1997; Cohen et al., 1998a; Donahue et al., 1999; Griffith and Ripich, 1999; Melamed and Wozniak, 1999; Prizant, 1999). From the age of two/three, disorders in sensory information integration can be measured with the standardized Motoric Observation (e.g. Ayres, 1979; Wilbarger and Wilbarger, 1991). From the age of four, more general information processing disorders can be measured. Low IQ scores (IQ < 70) in children automatically indicate information processing disorders, often referred to as mental disorders. Some neurological disorders are related to a genetic predisposition, whereas others are caused by prenatal drug or alcohol abuse of the mother, perinatal trauma (e.g. anoxia or preterm birth), postnatal trauma (head injuries, infective diseases, non-inherited metabolic disorders) or exposure to environmental toxins. These information processing disorders are regularly observed in populations of language disordered children (Bishop and Mogford, 1988; Nelson, 1993), psychiatrically disordered children (Cantwell and Baker, 1980; Guaitieri et al., 1983) and in both psychiatric and language disordered children (Bishop, 1997; Griffith and Ripich, 1999). In general, it is assumed that the lower the IQ, the more language and social-cognitive impaired the children may be. However, there are language and psychiatric disorders that are not associated with low normal functioning (IQ-scores between 85 to 100) or borderline intellectual functioning (IQ-scores between 71 to 85) (Goorhuis and Schaerlaekens, 1994; APA, 2000).

Psycho-social stress factors are third risk factors in the child's environment (e.g. Mesman and Koot, 2002). They are called stress factors, because life stress might negatively influence conditions for development. However, it has not been possible to find literature where the influence of such stressors on learning is explained in detail. It could be the case that these stressors take away time and energy from the child as he copes with negative experiences. The child might then be less open or positive towards new stimuli and learning situations. Thus, stressors might facilitate the development of LI and PI (van Leeuwen et al., 1988; Cantwell and Baker, 1991; Donahue et al., 1999; Prizant, 1999; Rutter and Taylor, 2002). Examples of such stressors may be a lack of parental warmth, inadequate parental supervision (e.g. too high demands), parental divorce, frequent change of residence, family conflict, discord and hostility; family illness or loss; hospitalisation, foster-home placement, expulsion from school/home; being teased at school/home, being deprived of food, freedom of movement, or of communicative interaction. However, in language and/or psychiatrically disordered children only specific stressors have been found to increase the risk of developing the disorders, such as living in a family with lower social economic status (SES) (e.g. Giddan, Milling and Campbell, 1996; Lavigne et al., 1996), living in a single parent (mother) household (Cantwell and Baker, 1991; Cohen et al., 1993; Lavigne et al., 1996), living with a depressed mother (Richman and Stevenson, 1977) or a less well educated mother (Baker and Cantwell, 1982b; Cohen et al., 1998a), or living in a large family (Richman and Stevenson, 1977). However, other research reports contradictory
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results. For example, Beitchman, Hood and Inglis (1990) and Cohen and colleagues (1998a) did not find that a lower SES increases the risk for the emergence of LI and/or PI. Systematic investigation in different subpopulations is still necessary to measure the effects of third risk factors alone or in combination, since the negative influence of some third risk factors is not always clear. In this respect, the onset time and the duration of exposure to a third risk factor might be important. Additionally, possible protective environmental circumstances, such as a profitable educational environment, might diminish their negative effect (Prizant et al., 1990; Donahue et al., 1999).

2.3 Theories about linguistic and social-cognitive development

Although some theories focus more on development than others, they all contribute to our understanding of linguistic and social-cognitive development (see Table 2.2). First, Executive Function Theory and Central Coherence Theory both try to explain changes in development by making information processing mechanisms central prerequisites for development in general. They are therefore called 'theories based on prerequisites' (see 2.3.1). Modularity Theory, Principles and Parameters Theory and Connectionist Theory all assume a strong genetic component; these are called theories from the inside-out (see 2.3.2). Conversely, Constructivist Theory, Social Interactionist Theory, Functional Theories and Theory-of-mind Theory emphasize that (linguistic) interaction with the environment predominantly shapes development in general; these are called theories from the outside-in (see 2.3.3).

Table 2.2 Theories about linguistic and social-cognitive development

<table>
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<tr>
<th>Theories based on prerequisites</th>
<th>Theories from the inside-out</th>
<th>Theories from the outside-in</th>
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<td>Executive Function Theory</td>
<td>Modularity Theory</td>
<td>Constructivist Theory</td>
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<tr>
<td>Central Coherence Theory</td>
<td>Principles and Parameters Theory</td>
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<td>Connectionist Theory</td>
<td>Functional Theories</td>
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<td>Theory-of-mind Theory</td>
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In each subsection covering a specific theory, we will not focus on placing the theory in a historical perspective nor describe how theories might be related to one another and built upon each other. Rather, we will start with a short critical overview of the most important explanations of typical and atypical development and how these contribute to the comorbidity issue. More specifically, we will describe which causal relationship of the comorbidity of LI and PI is most favoured by a specific theory. If possible, we will present empirical data that confirm the existence of such a causal relationship between LI and PI – as proposed and explained by the theory – in specific populations of disordered children.
2.3.1 Theories based on prerequisites

Executive Function Theory (Pennington and Ozonoff, 1996; Tannock, 1998; Westby, 1999) and Central Coherence Theory (Frith and Happé, 1994) both assume that deficits in central information processing mechanisms – possibly based on underlying neurological and/or genetic abnormalities – increase the risk for developing language and psychiatric disorders.

Executive Function Theory

Within Executive Function Theory the possible influence of executive functions on development in general is explained. Executive functions refer to the partly innate (meta)cognitive information processing mechanisms. Exactly what these mechanisms are is still subject to debate. Traditionally, Attention and (short-term) Memory have been postulated as executive functions (e.g. Pennington and Ozonoff, 1996). Motivation is added here on the basis of Trevarthen and Aitken (2001). They proposed the existence of an innate, Intrinsic Motive Formation (IMF) responsible for a new-born infant being oriented towards human stimuli and being highly sensitive to receive sensory-motor and language information. This motivator system may be a prerequisite to be able to imitate and to learn human signals, especially language. This results in the triad Motivation, Attention and (short-term) Memory (MAM) that might mutually influence each other (e.g. Elbers and Van Loon-Vervoorn, 1998). Leonard (1998) suggests that Specific LI is the result of a limitation on information-processing capacity, such as through restrictions on memory 'space', 'energy' for task completion and processing 'time'. The limited processing capacity may account for many difficulties in language and social-cognition, but cannot provide explanations of the exact nature of LI and/or PI.

In the developmental literature, executive functions were initially almost exclusively related to children's school achievements. Recently, the executive functions, especially MAM, are seen as prerequisites to perform a behavioural task in a goal-oriented way, such as making a plan. This plan is a mental representation of the behavioural task and involves sequencing, anticipating and hierarchical organizing. From birth on, executive functions improve and therefore planning capacities increase with age. Between five to eleven years, children learn to develop planning strategies, to conceptualize the domains that can be planned and the consequences of different planned tasks (Kail, 1984; Kreitler and Kreitler, 1987).

Language plays an important role within Executive Function Theory. At the age of three to five years, children develop a self-regulatory capacity, mainly by the use of internalized language. They learn to inhibit initial immediate responses (i.e. response inhibition) in favour of goal-oriented behaviour (Eslinger, 1996; Barkley, 1997; Rogers-Adkinson and Griffith, 1999). By the use of inner language, children can also learn to solve cognitive and social problems effectively, that is when their desires or needs differ from those of the environment. However, children stay goal-oriented not only by using inner language, but also by verbal negotiation and verbal instruction given by caregivers, teachers and playmates. The language used keeps children oriented towards specific goals and holds them motivated to execute those step-by-step actions necessary to achieve a certain goal.
Language not only helps in the development of executive functions, but conversely language development itself is dependent on the development of MAM.

Motivation, Attention and Memory (MAM) are necessary in order to establish joint attention, the ability to maintain sustained visual attention focused on a certain entity (person, animal or object), situation or event. Simultaneously, children receive related language input in reciprocal communicative interaction that enables them, for example, to name entities, situations and events. MAM is also involved in identifying, recognising and storing of more complex language information (Love and Thompson, 1988; Cohen et al., 1993). For example, the planning, organisation and monitoring of extended stretches of language, such as discourse and narratives, places heavy demands on all three of these executive functions (Westby, 1999).

Deficits in Motivation, Attention and Memory, probably caused by genetic and/or neurological abnormalities, negatively affect goal-oriented behaviour. This is set out in the Executive Dysfunction Theory (e.g. Frith and Happé, 1994; Russell, 1997; Happé et al., 2001). For example, when children are less motivated to engage in communicative interaction, they are more at risk to develop language and psychiatric disorders. They elicit responses from caregivers that are less frequent and less positive than normally developing children do. This results in less (positive) language and social-cognitive input, which in turn might contribute to the emergence of both disorders (Prizant et al., 1990; Greenspan, 1992; Westby, 1999). MAM dysfunctioning might also cause a poorly developed self-regulatory language function. This could mean that children become less organized and effective in cognitive and social-problem solving, resulting in learning disorders and poor school achievements (see also 1.3.4). A poorly developed self-regulatory language function might cause externalizing psychiatric disorders in particular. When children are not able to use the self-regulatory language function to inhibit undesired behaviours, impulsive or aggressive behaviour could result. This emotional and behavioural dysregulation can be diagnosed as a psychiatric disorder if it is frequent enough (Van Leeuwen et al., 1988; Cohen et al., 1998a).

Executive dysfunctioning can cause poorly developed self-regulatory inner language (LI) that in turn, following this chain of reasoning, can cause emotional and behavioural dysregulation (PI), thus (LI → PI). MAM dysfunctioning can also directly cause impulsive behaviour. This, in turn, can negatively influence the development of the ability to establish joint attention necessary for learning language. Here, executive dysfunctioning causes emotional and behavioural dysregulation (PI) that in turn can cause a language disorder (PI → LI). We have shown here that Executive Function Theory predicts: LI → PI → LI etc. in a continuing causal chain. Notwithstanding the fact that the time-interval between both disorders remains unclear, this causal relationship might be best depicted by a two-way arrow (LI ↔ PI), reflecting that both disorders are interrelated from the very beginning.

Empirically, executive dysfunctioning is frequently found in children with SLI. In fact deficits in (auditive) short term memory or in the information processing of
hierarchical relationships are assumed to be a possible cause for the emergence of specific LI (e.g. Gathercole and Baddeley, 1990; Johnston, 1992; Tannock and Schachar, 1996; Tannock, 1998; De Jong, 1999).

Executive dysfunctioning is also observed in psychiatrically impaired children, mostly with externalizing disorders. First, in children with impairments on the autistic spectrum the Motivation to engage in social interaction is affected (e.g. Frith and Happé, 1994). MAM dysfunctioning in autistic children is related to disorders in response inhibition (being unable to delay or inhibit responses), in flexibility, in self-reflection and in monitoring, all necessary for goal-oriented behaviour, but MAM is also related to disorders in language (Baron-Cohen, Leslie and Frith, 1985, 1986; Johnston, 1985; Baron-Cohen, 1995; Pennington and Ozonoff, 1996). Second, MAM dysfunctioning is also frequently found in children with ADHD. In this subpopulation, Attention deficits are especially related to language and psychiatric disorders involving goal-oriented behaviour (Westby and Cutler, 1994).

Finally, executive dysfunctioning can also be observed in children with internalizing psychiatric disorders, such as Childhood Depression or Anxiety Disorders (APA, 2000). In these children emotional disorders can frequently evoke conflict situations, placing heavy loads on emotional processing of these negative experiences. This, in turn, may slow down or disrupt other mental activities such as the executive functions involved in information processing (e.g. Williams, Watts, MacLeod and Mathews, 1988; Bishop, 2002).

In sum, we argue that Executive Function Theory predicts that executive dysfunctioning will increase the risk for the emergence of both disorders. Furthermore, the direction of the comorbidity of LI and PI is best depicted by a two-way arrow (LI ↔ PI): both disorders are interrelated from the very beginning.

Central Coherence Theory
Central-Coherence Theory is defined as the ability to integrate perceptual information into a coherent whole (Frith, 1989; Frith and Happé, 1994; Jarrold and Russell, 1997; Happé, 1999, 2001; Van Berckelaer-Onnes, 2002). Children are born with a natural drive to integrate what they experience into a meaningful entity; this applies both to the language and the social-cognitive information they receive. 'Coherency' as an information processing mechanism could in our opinion be added to the other executive functions Motivation, Attention, and Memory, since Coherency is also a prerequisite for goal-oriented behaviour. Furthermore, the triad Motivation, Attention and (short-term) Memory (MAM) might mutually influence and determine Coherency. For example, when children are only motivated to attend to small differences instead of similarities, meaningful, coherent generalizations cannot be made.

Similar to executive dysfunctioning, Coherency dysfunctioning has a negative impact on developmental change in general. This means that language or social-cognitive information cannot be integrated into a coherent whole, but is perceived in rather fragmentary way. The anticipation and the organisation of goal-oriented tasks is even impossible in the most severe cases.
Empirically, Coherency dysfunctioning can be observed in language impaired children: they reveal, for example, deficits in causal reasoning, necessary to produce a coherent text (Bishop, 2002). Coherency dysfunctioning is also observed in psychiatrically impaired children, especially in autistic children. Empirical data show that these children perceive daily life experience in a fragmentary way and are therefore disturbed in acquiring general goal-oriented social-cognitive and language skills. Even the integration of linguistic and non-linguistic gestures, such as reaching and eye-gaze, used in early communicative goal-oriented interaction seems to be a difficulty in many autistic children (Van Berckelaer-Onnes, 2002). By comparing both groups of disordered children, it becomes clear that Coherency dysfunctioning might differ in severity: from relatively mild in LI-children to relatively severe in autistic children, affecting overall development.

In sum, Central Coherence Theory predicts that Coherency dysfunctioning causes both disorders. It is not yet clear, however, from the formulation of the theory what it might predict about the relationship between LI and PI.

In the future, Executive Function Theory and Central Coherence Theory should be integrated and developed into a more complete theory. The interrelationships between all possible executive functions that are involved in the development of general information processing should be explored, including Motivation, Attention, Memory and Coherency. In the future, we think that even Relevance might be put forward as being yet another (partly) innate, executive information processing mechanism (e.g. Sperber and Wilson, 1986). For example, explicitness and transparency in fine-tuned language and social-cognitive behaviour is based on aiming at Relevance (see 12.2 to 12.8).

2.3.2 Theories from the inside-out

Theories from the inside-out are Modularity Theory, Principles and Parameters Theory and Connectionist Theory. In their most recent versions, these theories share a basic assumption: changes in development have a genetic component (e.g. Braine, 1994).

Modularity Theory

In Modularity Theory, it has been assumed that an innate language module exists separately from other cognitive modules (emotional/social development is ignored) and that they operate independently from each other (Fodor, 1975, 1983). Some interdependence between the modules has been added in later work (e.g. Karmiloff-Smith, 1992). Different language submodules/domains have been identified, such as the phonologic, morphological, syntactic, semantic and pragmatic modules. This assumption is now widely used and accepted (McTear and Conti-Ramsden, 1992; Jackendoff, 1997). Even microdomains have been differentiated within a certain subdomain, such as one for 'linguistic reference' within semantics/pragmatics (Karmiloff-Smith, 1992).

1 'Module' refers to a specific location in the brain, as opposed to 'domain' that refers to the cognitive representations and actions in the mind that are located within a specific module (Karmiloff-Smith, 1992).
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From a modular perspective, which claims the existence of an independent language module, children can be impaired in the language domain, whereas other social-cognitive domains stay intact or vice versa. However, recent empirical evidence from different groups of disordered children does not confirm this assumption. For example, children with Down's Syndrome are found to have more across-the-board domain-general deficit in cognitive processing (Karmiloff-Smith, 1992; Miller, 1996). SLI-children have been found to have not only exclusively language disorders, which has been claimed for a long time, but also disorders in social competence (Fujiki and Brinton, 2002). Children on the autistic spectrum not only show mild to severe social-cognitive deficits, but also language deficits in the semantic-pragmatic domain (Bishop, 1997). Children with William's syndrome have been found to have difficulties in the cognitive subdomain related to spatial knowledge and this is reflected in the impaired use of spatial terms in language (Pléh, Lukács, Racsmány and Kovács, 2002).

With respect to language growth, some researchers suppose that the subdomains within the language domain give input to each other and that this input causes language development on the basis of general cognitive learning procedures. This is referred to as semantic, syntactic and pragmatic bootstrapping. First, semantic bootstrapping enables the child to use semantic notions as evidence for the presence of grammatical entities. For example, noun-words trigger different morphological/syntactic rules as opposed to verb-words (Pinker, 1984, 1989). Second, syntactic bootstrapping enables the child to use syntactic information to predict the meaning of words (Gleitman, 1990). Last, pragmatic bootstrapping enables the child to use information about the pragmatic function of words (their relevancy in communicative interaction) in order to differentiate between morphological/syntactic rules, independently from the meaning of those words (Van Kampen, 2000, 2001).

All proposals of such bootstrapping mechanisms suggest that language domains are designed in such a way that information developed within one domain can be the input to development in another domain.

Although Modularity Theory does not explicitly contribute to the comorbidity issue, the proposed theoretical ideas about bootstrapping suggest that disorders in one language subdomain will affect other language domains in disordered populations. Following this chain of reasoning, it will be unlikely that only a morphological/syntactic or semantic/pragmatic disorder can be found in PI-children with different types of psychiatric disorders (Cohen et al., 2000; see 1.3.3). Empirical evidence in disordered populations other than the psychiatrically impaired supports this idea. For example, in children with Down's Syndrome morphological/syntactic and semantic/pragmatic aspects of language acquisition have both been found to be delayed (Parigger and Baker, 2002). However, according to the original assumption of strict modularity, language subdomains might also be partly independent in their functioning, since in children with William's Syndrome more semantic than morphological/syntactic disorders were found (Thomas, Dockrell, Van Duuren, Messer, Parmigiani and Karmiloff-Smith, 2002).
Thus, the language module seems more interrelated to the social-cognitive module than originally claimed by Modularity Theory, probably even in some of its language and social-cognitive subdomains. Although Modularity Theory does not explicitly contribute to the comorbidity issue, empirical data suggest that disorders in the language module and social-cognitive modules must frequently co-occur in disordered populations. Modularity Theory predicts that, although development is partly domain-specific, both language (LI) and social-cognitive (sub)modules (PI) are frequently simultaneously affected caused by domain-general learning deficits. However, the direction of the causal relationship of the comorbidity of LI and PI is not accounted for.

Principles and Parameters Theory
In Principles and Parameters (P&P) Theory (Chomsky, 1981, 1995), it is assumed that humans are genetically predisposed to learn language. First, children are not only equipped with an innate set of universal principles that are fixed (unchangeable) and applicable to every language, but also with innate parameters. These provide a child with a limited number of options for particular aspects of language, such as word order. They will be set by the child on the basis of language input (Roepert and Williams, 1987; Clahsen, 1992; Pinker, 1994). Like Modularity Theory, P&P Theory also assumes a separate syntactic module. Within this theory the acquisition of morphology and syntax has been worked out in great detail (e.g. Hyams, 1992; Chomsky, 1995). Some P&P researchers also relate the syntactic module to other language areas. Semantic development is seen by some as an important drive for syntactic development (Jackendoff, 1983; Clahsen, 1992; Pinker, 1994). Recent research in this framework has explored how the pragmatic function of language use triggers specific syntactic forms (Hollebrandse, Roepert and De Villiers, 1999; Van Kampen, 2001).

P&P Theory has been applied to normal language development and also to children with language disorders. Evidence from children with SLI shows that language rules are frequently violated, especially in inflectional verb and noun morphology resulting in morphosyntactic disorders (see De Jong, 1999). However, disorders in morpho-syntax in this group of children seem to be relatively infrequently related to disorders in other language areas, such as semantics/pragmatics. P&P Theory does not explicitly predict that PI can cause LI, restricted to the formal aspects of the language system. The strongest claim is that PI should have no effect on language development at all (Mills and Tso, 1991). If it is assumed that children learn language-specific rules over time triggered by the language input (Wexler and Manzini, 1987; Felix, 1992), then input that is different in some crucial aspects could negatively affect the possibility to learn the target language. Although the input to PI-children has not yet been explored, it might be quite different from the input normally developing children receive. For example, children with ADHD might receive relatively many commands focussed on the regulation of non-cooperative behaviour (e.g. 'sit still'; 'stop it'). Following this chain of reasoning, PI-children might evoke different input that can cause LI.
If it is assumed that language rules become available in an ordered way over time triggered by an innate maturation program (Borer and Wexler, 1987; Roeper and Williams, 1987), the speed of syntactic developmental growth might well be determined by the general speed of maturation of the child (Mills and Tso, 1991). Slow maturation would not only cause language delays but must also affect social-cognitive growth (Ruhland, 1998). It is very unlikely that slow maturation would exclusively cause morphological/syntactic disorders; semantics/pragmatics would also be affected.

In sum, only if a maturation program is assumed, P&P Theory suggests that LI might exist alongside a PI. However, since morphological/syntactic disorders are never related to disorders outside the language domain, such as psychiatric disorders, P&P Theory makes no predictions about the comorbidity between LI and PI.

**Connectionist Theory**

Connectionist Theory focuses particularly on language and cognitive information processing (McClelland and Rumelhart, 1986; Rumelhart and McClelland, 1986; Smith, 1996). According to this theory, children are thought to be innately predisposed to learn language and other non-social cognitive skills on the basis of the input (e.g. Seidenberg, 1994; Elman, Bates, Johnson, Karmiloff-Smith, Parisi and Plunkett, 1996; Plunkett, Karmiloff-Smith, Bates, Elman and Johnson, 1997; Bates and Elman, 2002). Social-cognitive development, especially emotional development, falls outside the scope of this theory (e.g. Smith, 1996).

Connectionist Theory searches for explanations of development in general using computer simulations based on neural networks. When applied to language, for example, specific learning tasks, such as sentence comprehension or question answering, are studied as to how they are learned on the basis of language input. The language information processing system is constantly adjusted in order to become consistent with the language evidence from the input. Language acquisition also occurs when children use language evidence from their own output, being recursively used as input. The connective patterns that are triggered most frequently by the input become most consistent, and therefore win the competition (Bates and MacWhinney, 1987). Variation in language abilities within and across cultures is assumed to be a result of varying input experiences.

Connectionism says nothing about the relationship between language and other cognitive domains. The theory does not exclude social, communicative interaction but since it works with neural networks there has to be an assumption of connections between these areas. This is not made explicit. Conversely, Connectionist Theory explicates that self-organizing language and other cognitive information processing systems exist, developing from small and simple to larger and more complex over time. In reality, small and gradual internal changes in these systems can lead to huge non-linearities observable in overt language and other cognitive behaviour (e.g. Van Geert, 1995; Ruhland, 1998). The connection information networks are not only activated at many levels at the same time, but also simultaneously connect information in a hierarchical way (e.g. Bates and MacWhinney, 1987; Clark, 1989;
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Levelt, 1989; Karmiloff-Smith, 1992; Elman, 1993; Smith, 1992, 1996; Plunkett et al., 1997; MacWhinney, 1998; Bates and Elman, 2002).

Empirically, language and some aspects of cognitive information processing are explored in adults and children with brain damage (e.g. McClelland et al., 1995; Smith, 1996; Plunkett et al., 1997; MacWhinney, 1998). Early damage of connections between information units is observed to be less severe than later damage, since initially connections are smaller in number and more flexible than later, more fixed connections. It is also found that the greater the damage was, the greater was the degree of degradation in performance, which might even be progressive in character. It was also explored how the computer simulation system copes with executive dysfunctioning limited to a restricted working memory. This proved to influence language learning negatively. Executive dysfunctioning in Motivation, Attention and Coherence was not explored (see 2.3.1), since Connectionist Theory does not relate disorders in the social-cognitive domain to disorders in language. Although this theory describes language and some aspects of cognitive development based on similar information processing systems, no explicit predictions are made about the comorbidity of LI and PI. This falls outside the theory its scope, comparable to the other two inside-out theories presented earlier.

2.3.3 Theories from the outside-in

Theories from the outside-in are Constructivist Theory, Social-Interactionist Theory, Functional Theories and Theory-of-Mind Theory. These theories put emphasize on developmental change as the result of what is learned on the basis of experience.

Constructivist Theory

Constructivist Theory of Piaget (1952, 1959, 1970a, 1970b, 1971) explains how the child constructs a meta-social-cognitive information processing system based on experience; the ability to do this is presumed to be innate (see for a critical review Bates, Thal and Janowsky, 1992; Karmiloff-Smith, 1992; Bates and Elman, 1996, 2002). Within this theory the (language) information received from the environment is generated by the child as an active learner, starting with the imitation of language and other social-cognitive behaviour. Children are thought to be constantly organizing information on the basis of the available input into mental representations that represent their experiences, and simultaneously organizing these representations into hierarchically ordered systems.

Piaget (1952, etc.) underestimates the status of language. However, the description of how mental representations become more complex during social-cognitive stage-bound development is applicable to language development: the actual world is often represented by language representations. With age children change their language behaviour from simple language representations to higher forms of logical reasoning. This type of reasoning was first described by Piaget. Thus, continual increase in the complexity of language is a result of active construction, and not a gradual unfolding of predetermined forms that mature with age.

However, in most of Piaget's work, language behaviour was seen solely as a product of general changes in the child's social-cognitive behaviour. Therefore, language
development is often described as embedded in age-related stages of social-cognitive development, whereby each stage is to be successively built on its precursors. This is a debatable assumption on the part of Piaget but it has been put forward by many researchers in the field of psychology, psychiatry and psycholinguistics (e.g. Hulit and Howard, 2002).

Although Piaget does not explicitly address disordered or delayed development, we can infer, following this assumption, that social-cognitive disorders must necessarily include language disorders or delay, since language is seen as part of social-cognition.

Thus, although no empirical data are available, this Constructivist Theory would predict that both LI and PI can co-occur and usually will. The causal relationship of the comorbidity of LI and PI would be one of inclusion, whereby PI automatically includes LI (e.g. Goorhuis and Schaerlaekens, 1994). The comorbid relationship might be best depicted by a unicausal direction (PI → LI).

Social-Interactionist Theory
In contrast to Piaget, in Social-Interactionist Theory Vygotsky (1976, 1986 and earlier) assumes that language use in affective, social interaction triggers social-cognitive development in general, based on underlying innate, general learning capacities.

Vygotsky emphasized the role of language, and especially the role of inner language, as the carrier of inner thoughts. He assumed that by inner language all types of overt behaviour could be intrinsically motivated and controlled. Additionally, verbal negotiation and instruction are assumed to be extremely influential on social-cognitive development. For example, by verbal guidance of adults or more capable peers children develop from their actual developmental level of independent problem solving to the level of potential development. The distance between these two levels is known as the Zone of Proximal Development.

Vygotsky sees linguistic interaction as part of a much wider socio-cultural experience. Since the nature of social interaction varies across cultures, changes in language development that guide social-cognitive development vary widely across cultures. This idea implies that children start to learn language rules that are language specific and culturally specific from the beginning (Bruner, 1986; Vygotsky, 1986).

Junefelt (1990) applied the framework of Vygotsky to the development of subjectivity and intersubjectivity, in which language also plays a crucial role. The so-called ability of subjectivity implies that infants learn to master the difficulties of relating objects and situations to themselves and learn to predict the consequences of their own general behaviour, involving the active use of inner language. The development of ideas about other persons' consciousness and intentionality and applying these ideas in interaction is called intersubjectivity (Trevarthen, 1979; Trevarthen and Aitken, 2001). Intersubjectivity also involves the ability to coordinate the understanding of other's thoughts, feelings and desires that might be (partly) in conflict with children's attempts to balance inner needs with external demands — and vice versa —, also called social problem solving (Selman and
Demorest, 1984; Yeates, Schultz and Selman, 1991a, 1991b). In order to develop these two abilities, children need caregivers that are emotionally fine-tuned in interaction, willing to teach their children about inner feelings, desires and needs. Later, (inter)subjectivity is also learned by the use of inner language and dialogue, both regulating behaviour called self-control (Frith, 1989; Hobson, 1993; Baron-Cohen, 1995).

Vygotsky (and Junefelt) do not explicitly contribute to the comorbidity issue (but see Vygotsky, 1986:232 and further), but the proposed theoretical ideas suggest that abnormal affective communicative linguistic interaction negatively influences the development of (inter)subjectivity by means of internalized language and dialogue necessary for self-regulation and control (Cohen et al., 1998a). Empirically, such impaired developmental patterns have been frequently observed in psychiatrically disordered children, such as autistic children (Vygotsky, 1986; Van Berckelaer-Onnes, 2002), children with schizophrenia (Vygotsky, 1986) and ADHD (Trevarthen and Aitken, 2001).

Thus, Social-Interactionist Theory, assuming that social-cognition is guided by language development, would predict that both disorders can co-occur and mostly do, and the causal relationship of the comorbidity of LI and PI is thought to be one of inclusion, whereby LI automatically seems to include PI. Cohen and colleagues (1998a) argue this relationship might best be depicted by a unicausal direction (LI → PI).

**Functional Theories**

Since no single overall functional theory exists, but many different theories focus on the communicative function of language, we describe functional ideas under the heading of Functional Theories. In these theories language is conceptualized as an instrument of social interaction, used with the intention of establishing communicative relationships and the transmission of information (Brown, 1973; Bruner, 1976; Craig, 1983; Dik, 1989; see for an overview Van Balkom, 1991; McTear and Conti-Ramsden, 1992). Furthermore, language is learned in interaction on the basis of language input that is thought to be highly structured and adapted to the level of language functioning of the child (e.g. Newport, Gleitman and Gleitman, 1977).

Functional Theories focus on the effective use of language and linguistic information exchange in context. Accordingly, it is assumed that language use influences the language content and (in turn) the morphological/syntactic form (Sperber and Wilson, 1986; Dik, 1989). Thus, these theories reject strict modularity (see 2.3.2) that implies only domain-specific language learning. Rather, language development is seen as a complex and multifaceted system intertwined with social-cognitive development (e.g. Snow, 1996). It is emphasized that language (e.g. verbal interaction and instruction) is an important mediator for social-cognitive learning. For example, children only learn to name objects after they have heard others name them. Accordingly, individual variation in language skills might be explained, among other things, by the received verbal information related to daily experience that differs among individuals.
Empirically, from a functional perspective on language disorders, different ideas have been put forward on the influence of disorders in language use on social-cognitive development. First, the learning of the rudiments of communicative language use, exchanging information by turn, is assumed to occur in conjunction with the separation-individuation process in the young child. It is suggested that disorders in communicative language use in young children (below the age of one year) might disturb the separation-individuation process and the development of a sense of self later in time. When severe enough, this might be diagnosed as an important characteristic of psychiatric disorder (Love and Thompson, 1988).

Second, as the language impairment is characterized by frequently not understanding verbal messages of others and not being understood by others in verbal interaction, many instances of miscommunications might lead to a distortion of a child’s basic mood. They might develop permanent feelings of impatience or feelings of frustration, fear, anger and sorrow (Silva, Williams and McGee, 1987; Beitchman et al., 1990; Goorhuis and Schaerlaekens, 1994). When children are impaired in talking about these feelings, this might increase the chance of developing externalizing (e.g. destroying things and relationships) and internalizing (e.g. being withdrawn from interaction; self-abusive behaviour) psychiatric disorders over time (Prizant et al., 1990).

Third, when children show problems following verbal instructions, they might not be able to react as expected, causing parents to behave differently with these children than with normally developing peers. This interaction might be negatively affected by subtle or more severe feelings of aggression in caregivers that lead to an avoidance of interaction, and feelings of anxiety that might lead to overprotection. Frequent failures in following verbal instructions might be extremely damaging for the child when the environment reacts extremely negatively, such as in case of maltreatment and child abuse (Love and Thompson, 1988).

Fourth, language disorder might cause children to participate in less positive social interactions, to converse less often with peers during (non-)play activities, to be less involved in organizations and non-sport activities, and to be less successful in social bids, less directive and less integrated in play groups than the children without language disorders. However, symbolic play and playing with peers are thought to be a very important playground for overcoming fears and for processing important life events (Guralnick, Connor, Hammond, Gottman and Kinnamon, 1996). If language impaired children play less frequently and sophisticatedly with other children, this might indirectly increase their chance to develop a psychiatric disorder (Van Leeuwen et al., 1988). Since language disordered children can be considered less attractive playmates and are often not accepted into social groups (Rice, 1993; Beitchman et al., 1996; Donahue et al., 1999), this can also contribute directly to the development of a psychiatric disorder (Baker and Cantwell, 1987).

All these causal relationships in which LI increases the chance to develop PI have frequently been suggested by researchers. Language disorders can lead to a variety of social-cognitive deficits that might be so enduring that they cause psychiatric disorders over time (Prizant et al., 1990; Cantwell and Baker, 1991; Beitchman et
The causality of comorbidity

al., 1996; Cohen, 2000). When a disturbed interaction continues, both impairments might even become worse. This negative vicious downward spiral might have long-lasting negative effects on an individual's overall functioning, even into adulthood (Westby, 1999).

On the basis of empirical data, these causal relationships are frequently found to exist in populations of children with different types of semantic-pragmatic language disorders and psychiatric disorders, especially disorders on the autistic spectrum (Bishop and Rosenbloom, 1987; Rapin and Allen, 1987). However, empirical data also show that the same causal relationship might exist between LI and PI in children with language disorders, including morphology/syntax, and with psychiatric disorders not limited to the autistic spectrum, but included different externalizing and internalizing disorders (e.g. Cantwell and Baker, 1991; Beitchman et al., 1996; Cohen et al., 1998a, 2000).

Functional theories seem to predict that the direction of the causal relationship of the comorbidity of LI and PI is unicausal in character, best depicted by a one-way arrow (LI → PI).

Theory-of-Mind Theory

ToM Theory describes and explains how children internally construct a lay theory about social interaction, called their Theory-of-Mind. This largely involves the ability of 'mindreading': the ability to interpret other people's actions based on their presupposed goal-oriented intentions that are hidden in their minds. Such interpretations are necessary to come to a coherent, causal understanding of social interaction (Perner, 1991; Karmiloff-Smith, 1992; Wellman, 1992; Baron-Cohen, 1995; Baron-Cohen, Tager-Flusberg and Cohen, 2000). Some aspects of a Theory-of-Mind have been integrated into theories about language development (e.g. De Villiers, 2001a, 2001b).

Language development plays a central role in the development of a Theory-of-Mind. By means of language children learn to describe human action and interaction, and the underlying motivation and causality of such (inter)actions. Furthermore, through linguistic interaction, a child's ToM can be checked with the ToM of others, called 'reality testing'. This forms input to the child which helps ToM skills to develop.

Before age one, children preferentially attend language input related to human actions (i.e. joint attention) (Premack, 1990; Johnson and Morton, 1991). This enables them not only to build (language) representations about themselves (i.e. subjectivity), but also about others (i.e. intersubjectivity) (e.g. Frye and Moore, 1991) (see 2.3.3). From age two, they develop representations about other people's feelings and thoughts, called 'mental states', enabling them to exhibit emotions in response to others. From two to three years of age, children start to make representations about the relation between reality and representations of this reality; they start to understand that pictures are a representation of the real world.

By three years of age, they learn that knowledge is the product of perception (e.g. 'seeing leads to knowing'). They therefore show evidence of understanding what others know and understand, if this does not conflict with perceptual information. Once children begin to understand emotions as mental states (expressed by emotional verbs such as like, love, dislike, fear etc.), they realize that the same
situation can produce different emotions in different people (Baron-Cohen, 1988, 1995; Perner, 1991; Karmiloff-Smith, 1992; Wellman, 1992; Leslie, 1994; Westby, 1999). In the pre-school years, children even exhibit considerable awareness of how to affect mental states of others (Wellman, 1992; Rogers-Adkinson and Griffith, 1999). Meanwhile, they begin to pretend and to recognize the pretending of others, developing a notion of truth. In this period, language use in symbolic, imaginary play-activities, make-believe and group games are extremely important for developing a ToM (Premack, 1990; Baron-Cohen, 1995).

From age four to five, children start to learn that a communicative message always contains some subjectivity related to its messenger, expressed by the use of mental state verbs (e.g. think, know, hope, believe, pretend, remember, claim). Children learn that the sentence embedded in a mental-verb-sentence-frame does not necessarily entail the truth, realizing that people can hold false beliefs. Between age six and seven, they learn to use nested beliefs themselves (e.g. 'Paul thinks that Suzy thinks...') (Perner 1991; Karmiloff-Smith, 1992; Wellman, 1992).

School-aged children need to learn how to read another person's mind, such as volitional mental states (desires and goals) in order to interact successfully and to create meaningful social relatedness with others (Baron-Cohen, 1995). They must also learn to tie together their own and another person's mental state conditions into a coherent understanding, necessary, for example, to solve social conflicts (Cohen et al., 1998a). Also meta-representational, hierarchically ordering skills involved in ToM are believed to affect the way children can access and scan their own mental repertoire beyond the areas of currently activated content, called divergent thinking (Suddendorf and Fletcher-Flinn, 1997).

Empirically, in order to check specific delays or deficits in ToM, a series of experimental tests are used, such as the well-known false belief tasks (e.g. Wellman, 1992). Less frequently, observations of language and social-cognitive behaviour are used to infer the underlying ToM (dis)abilities in children, and these are then often compared to the results on certain ToM tasks (e.g. De Villiers and De Villiers, 2002; Pérez-Pereira and Resches, 2002).

Little is known about what spontaneous language might reveal about children's ToM development. There exists, however, an unclear area of interrelatedness, as the mastery of linguistic abilities plays a central role in the emergence of ToM, especially the ability to reason about mental states. (e.g. Astington and Jenkins, 1999; De Villiers and De Villiers, 2002).

Recently, part of the domain specialized in ToM has been treated as modular, partly encapsulated, although still connected to other domains (Baron-Cohen, 1995). How the ToM domain itself is recruited by the language domains for their functioning has been explored (De Villiers, 2001a, 2001b; Hollebrandse, 2001). Within the field of morphology/syntax, for example, it is speculated that ToM insights are used to successfully apply reference rules, especially with respect to the use of determiners

2 They always require language, and it is questionable therefore whether ToM tasks are reliable and lead to valid results (e.g. Van Berckelaer-Oomens, 2002).
The causality of comorbidity

(Thrift, 2003) and sentence embedding (Hollebrandse, Roeper and De Villiers, 1999). For example, if the child has not yet developed that part of ToM that represents how another person's mental state might be motivating their actions, embedded sentences cannot be produced correctly. Within semantics/pragmatics, for example, it is investigated how ToM insights are necessary in order to successfully apply reference rules, especially with respect to the use of pronouns (Pérez-Pereira and Resches, 2002).

Researchers have indicated that language disordered psychiatrically impaired children often have severe ToM deficiencies (Cohen et al., 1998a, 1998b, 2000). This is explained by different assumptions about the causal relationship that underlies this comorbidity. We suppose that language disorders might frequently cause instances of miscommunication. A disturbed communication might, in turn, cause a delay in the development of joint attention, and of notions of subjectivity and intersubjectivity, necessary for the acquisition of certain ToM skills, such as the ability to take someone else's perspective. Furthermore, we think that language disorders might negatively affect the ability to express social-cognitive knowledge. This can be observed when children express loosely connected mental associations and unclear causal reasoning that show underlying ToM impairments. Clear thinking and reasoning are especially important in learning and (social) problem solving (Harter, 1983; Schultz, Izard, Ackerman and Youngstrom, 2001; Bishop, 2002; Van Berckelaer-Onnes, 2002).

Language disorders might also negatively influence the quality of imaginary and pretend play, decreasing the chance for language disordered children to be involved in such games. As these games are thought to be necessary prerequisites for building ToM, a withdrawal from these games increases the chance for ToM deficiencies (Van Leeuwen et al., 1988).

Especially autistic children show language disabilities in expressing reality on the one hand and fantasy involved in pretend and imaginary play on the other (Frith, 1989; Blijd-Hoogewys, Serra, Loth, Van Geert and Minde, 2002). These autistic children were wrongly supposed to have only an impaired ToM module, also referred to as 'mindblindness' (Baron-Cohen, 1995), since the language domain was also clearly affected.

However, the Baron-Cohen study inspired many others to explore the development of ToM in children with other psychiatric disorders. Comparably, a (partly) disordered ToM was observed in children with schizophrenia (Corcoran, Mercer and Frith, 1995), with ADHD (Love and Thompson, 1988; Buitelaar, Van der Wees, Swaab-Barneveld and Van der Gaag, 1999), with anxiety or oppositional conduct disorders (Steerneman, 1994) and pervasive developmental disorders (Baron-Cohen, 1995). When ToM is disordered, children might rely less on this theory in every day life experiences, increasing the risk for developing social-cognitive problems. If

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3 Children with IQ rates below 80 were also found to have ToM deficiencies, presumably based on executive dysfunctioning (Yirmiya, Erel, Shaked and Solomonica-Levi, 1998) preceding LI and PI (Table 2.1).
this lasts long enough, it might lead to the emergence of PI. Thus, ToM Theory is thought to predict that the direction of the causal relationship of the comorbidity of LI and PI is unicausal in character, being best depicted by the one-way arrow: (LI → PI).

2.4 General conclusions and additional remarks
In Table 2.3, we summarize how the different developmental theories are thought to predict possible causal relations between language and psychiatric disorders: (1) PI → LI; (2) LI → PI or (3) (LI ↔ PI). Where a prediction can be made, a plus is inserted in the table.

Table 2.3 Inferred predictions about the direction of the causality of the comorbid relation between LI and PI

<table>
<thead>
<tr>
<th>Theories</th>
<th>Causal relationship 1 (PI → LI)</th>
<th>Causal relationship 2 (LI → PI)</th>
<th>Causal relationship 3 (LI ↔ PI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theories based on prerequisites</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Executive Function Theory</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Central Coherence Theory</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Theories from the inside-out</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Principles &amp; Parameters Theory</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Modularity Theory</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Connectionist Theory</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Theories from the outside-in</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constructivist Theory</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Social Interactionist Theory</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Functional Theories</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Theory-of-mind Theory</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

We see that only Executive Function Theory predicts an interrelated causal relationship between LI and PI from the very beginning, although language disorders might be seen as the starting point. When Memory, Attention and Motivation are dysfunctioning, both language and (immediately thereafter) social-cognitive development are affected, negatively influencing each other from that time on. 'Theories from the inside-out' are thought to predict no causal direction between LI and PI, although Modularity and Connectionist Theory allow both disorders to exist independently in one child. Next, 'Theories from the outside-in' all predict a unicausal direction of the relationship between LI and PI. Only Constructivist Theory presupposes that language is part of all other social-cognitive skills, predicting PI → LI. Conversely, all other three developmental theories emphasize
the role of language in interaction with the learning of social-cognitive and ToM skills. These theories would predict LI \( \rightarrow \) PI.

Current theories related to language and social-cognitive development should predict and explain the relatively high co-occurrence of LI and PI within individual children. We showed that relatively few theories make such predictions. Within these theories language disorders are seen as an important predictor for the emergence of internalizing and externalizing psychiatric disorders, especially of those disorders found in children on the autistic spectrum and with ADHD. However, specific language disorders (in different domains) are not yet exclusively related to certain psychiatric disorders. For example, although semantic/pragmatic disorders were found to co-occur frequently with disorders on the autistic spectrum (Bishop and Rosenbloom, 1987), morphological/syntactic disorders were found too (e.g. Van Berckelaer-Onnes, 2002).

In order to test the theoretical claims about the causality issue from different theoretical perspectives, only follow-up or longitudinal research designs seem to be suitable (see 1.3.4), provided that language disorders in different domains are described thoroughly in order to disentangle symptoms of LI from PI.

2.5 General research questions

It will not be our explicit goal to investigate the causality of comorbidity. Our main purpose here is to describe the possible existence of language disorders in different subdomains of language, namely morphology/syntax and semantic/pragmatics. This will be done with 120 Dutch-speaking children with a psychiatric disorder. We have developed detailed morphological/syntactic models of analysis (see 4.1) and semantic/pragmatic models of analysis (see 10.1) of spontaneous language in two genres. The analyses of morphological/syntactic and semantic/pragmatic skills in both genres will provide a detailed description of the language abilities of these PI-children. We will compare their language abilities with the language abilities of normally developing children (Roelofs, 1998) in order to detect language disorders (see 3.3). We elicited conversational language with a semi-structured interview and narrative language with a picture book (see 3.4). A detailed description of the language disorders in all areas in the PI-population is necessary in order to differentiate LI and PI symptoms better in the future, at the same time contributing to research on the causality issue.

Although language disorders can be seen as an important predictor for the development of PI, as stated above, these predictions have remained too vague and cannot predict specific psychiatric disorders (but see Beitchman et al., 2001). We will try to investigate the extent to which specific language disorders co-occur with specific psychiatric disorders (see 15.6 and 15.7).
The following general research questions are formulated:

**Main research question 1**
To what extent do Dutch-speaking PI-children have language disorders resulting in a comorbid relation of LI and PI in both genres?

**Main research question 1a**
To what extent do Dutch-speaking PI-children have specific language problems in the area of morphology/syntax?

**Main research question 1b**
To what extent do Dutch-speaking PI-children have specific language problems in the area of semantics/pragmatics?

**Main research question 2**
To what extent do Dutch-speaking PI-children have different language problems in the area of morphology/syntax and semantics/pragmatics when we compare both genres?

**Main research question 3**
Is there a relationship between specific language disorders in both genres with specific psychiatric disorders?
3 Research methods

Claudia Blankenstijn and Annette Scheper

3.1 Introduction
In our project we examine the morphological/syntactic and semantic/pragmatic development of 120 children with a psychiatric disorder. These data are compared with those from a group of 75 normally developing children (Roelofs, 1998) and 240 normally developing children (STAP; Van den Dungen and Verbeek, 1999). First, the selection procedures with regard to children with a psychiatric disorder are explained (3.2), including specific selection criteria (3.2.1), some background information and a description of the psychiatric disorders (3.2.2), and language test data (3.2.3). Second, the selection procedures, criteria and background information of the normally developing children are discussed (3.3). Third, we describe some details of the spontaneous language analysis (3.4) with respect to narrative (3.4.1) and conversation (3.4.2). Fourth, we present the morphological/syntactic and semantic/pragmatic models of analysis (3.5) and the classification of language impairment based on such models with respect to morphology/syntax (3.5.1) and semantics/pragmatics (3.5.2). Finally, we describe the different statistical analyses procedures used (3.6) and we finish with the formulation of the specific research questions (3.7).

3.2 Description of subjects: children with psychiatric disorders
Most of the Dutch-speaking PI-children (n=110) were attending psychiatric diagnosis and treatment in an Academic Clinic for Youth and Child Psychiatry. In the clinic children were seen for the first time in nearly all cases and participated in the language research project, temporarily appended to the standard psychiatric diagnostic procedure. The small inflow of four-year-olds at the clinic made it necessary to recruit half of the group four-year-olds from a Medical Day-care Centre (n=10), already diagnosed as having a psychiatric disorder and receiving special education.

The PI-children recruited were selected regardless of their Socio-Economic Status (SES), including PI-children with relatively high to low social backgrounds. Beitchman and colleagues (1990) and Cohen and colleagues (1998a) did not find that a lower SES increases the risk for the emergence of LI and/or PI (see 2.2). Both the Medical Day-care Centre and clinic are situated in the west urban region of the Netherlands (South-Holland).

3.2.1 Selection criteria
All the PI-children who finally took part in the project had to meet the following criteria:

(1) age range 4;0 to 10;0 years
(2) monolingual Dutch
(3) no hearing loss, IQ > 70
(4) no other severe disabilities
(5) able to carry out research tasks
(6) diagnosed as psychiatric disordered, not autistic or schizophrenic

During the data collection (1993 - 1999) 180 children with a psychiatric problem within the age range of 4;0 to 10;0 years in the clinic and Medical Day-care Centre participated in the psychiatric investigation, and were language tested for this study. Of these 180 PI-children 60 had to be excluded for various reasons: 30 because they did not meet the selection criteria (9 drop-outs were caused by missing test data, 4 drop-outs had an IQ below 70, 1 drop-out had unintelligible language, 3 children were bilingual and 13 were diagnosed as autistic), 10 because of no parental permission; 20 children fulfilled the criteria, but illness of children, defect of audio-visual material, or no availability of a research room made it not possible to include them.

The population of 120 psychiatric children that met the selection criteria, was limited to 4;0 to 10;0 years. Before age 4;0 a psychiatric diagnosis is hard to establish and referral to the clinic younger than four years of age rarely occurs. No reliable linguistic diagnostic instruments are available for children older than 10;0 years of age. The PI-children were selected in such way that there were 20 children per age group (Table 3.1).

The group PI-children consists of 33 girls and 87 boys, with a preponderance of boys as is typical for impaired populations. The sex ratio found in the population with a psychiatric disorder equals reported ratios in the literature: 25% girls and 75% boys. This is indicative for the population it represents (Cantwell and Baker, 1987; Cohen et al., 1989) (see 2.2). Although girls below age six are said to develop language qualitatively differently from boys (Van Alphen, 1999:32), sex of child will not be studied as a variable.

<table>
<thead>
<tr>
<th>Age groups</th>
<th>n=120</th>
<th>mean age*</th>
<th>Girls</th>
<th>Boys</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 yrs</td>
<td>20</td>
<td>4,7</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>5 yrs</td>
<td>20</td>
<td>5,7</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>6 yrs</td>
<td>20</td>
<td>6,9</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>7 yrs</td>
<td>20</td>
<td>7,7</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>8 yrs</td>
<td>20</td>
<td>8,6</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>9 yrs</td>
<td>20</td>
<td>9,6</td>
<td>8</td>
<td>12</td>
</tr>
</tbody>
</table>

* The first number indicates the number of years and the second the number of months.

We only included children from monolingual Dutch-speaking homes, as multilingual language development may differ from monolingual language
development (e.g. De Houwer, 1995). We excluded children with a moderate or severe hearing loss, because of its possible negative influence on language development (Bishop and Mogford, 1988; Bol and Kuiken, 1988). Children with an IQ lower than 70 diagnosed as 'mentally retarded' were excluded. These children have severe information processing difficulties that may negatively influence the development of language and social-cognition (see 2.2 and 2.3.1). The standard diagnostic test used at the clinic was the Wechsler Intelligence Scale for Children (WISC) (Wechsler, 1949) and at the Medical Day-care Centre the Raven's intelligence test (Raven, Court and Raven, 1986).

As can be seen from Table 3.2, the IQ scores of 115 PI-children were available and 5 were missing. The mean total IQ scores per age group indicate normal intellectual functioning. However, we observed some variation: more than half (n=61; 53%) of the 115 PI-children are of normal intelligence; the rest of the PI-children could be classified as low normal functioning (IQ 85 to 99) (n=44; 38%) or borderline intellectual functioning (IQ 71 to 84) (n= 7 IQ < 80; n=3 IQ 80 to 84; 9%) (see 2.2 and 2.3.1). Of the 7 PI-children with an IQ below 80 5 PI-children received the diagnosis PDD-NOS. It is still disputable where the dividing line between normal and abnormal intellectual functioning should be situated. Some researchers take a total IQ of 80 as opposed to the total IQ of 70 (e.g. Maassen, Poppelaars, Pasman and Rotteveel, 2001). The language and psychiatric impairments of 47% of 115 PI-children might very well be based on moderate to mild executive dysfunctioning and information processing difficulties (see 2.3.1).

<table>
<thead>
<tr>
<th>Age groups</th>
<th>IQ Total</th>
<th>IQ Peronal mean</th>
<th>IQ Verbal mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 yrs</td>
<td>107.1</td>
<td>109.1</td>
<td>101.8</td>
</tr>
<tr>
<td>5 yrs</td>
<td>107.7</td>
<td>109.1</td>
<td>104.6</td>
</tr>
<tr>
<td>6 yrs</td>
<td>100.8</td>
<td>103.6</td>
<td>98.1</td>
</tr>
<tr>
<td>7 yrs</td>
<td>94.5</td>
<td>97.5</td>
<td>93.9</td>
</tr>
<tr>
<td>8 yrs</td>
<td>103.7</td>
<td>109.0</td>
<td>99.1</td>
</tr>
<tr>
<td>9 yrs</td>
<td>98.1</td>
<td>99.6</td>
<td>99.3</td>
</tr>
</tbody>
</table>

PI-children with a clear clinical syndrome, such as Down's Syndrome or Williams' Syndrome, or any neurological, sensomotorical and/or visual problems were excluded. Neurological disabilities (e.g. Tannock, 1998), sensomotorical disabilities (e.g. Ayres, 1994) and visual disabilities (Wegener Sleeswijk, 1986; Baker, 1993) can have a negative effect on the language and social-emotional learning process.
3.2.2 Psychiatric diagnosis

The psychiatric disorder of all PI-children at the clinic was classified according to the DSM-III-R (APA, 1987) and at the Medical Day-care Centre the ICD-10 classification for mental and behavioural disorders (WHO, 1992) was used. Autistic and schizophrenic children were excluded, because inclusion would have increased the comorbidity rates. These children form separate groups of the most severely language impaired PI-children, in which the LI is a necessary – although not a sufficient – condition for PI (Cantwell and Baker, 1987; Prizant et al., 1990).

The medical and psychiatric information on all PI-children was collected by the psychologists and psychiatrists of the diagnostic teams. The medical records were used as documented in a computerized database of medical and psychiatric information (Treffers, Goedhart, Waltz and Koudijs, 1989). Part of this complete patient file consists of the information of a child, such as sex, age, life history and socio-economic status of the parents. The PI-children themselves were further tested. At the clinic the Diagnostic Interview Schedule for Children-Child version (DISC-C) was used; this is a standardized diagnostic interview developed for use in epidemiological studies of children and adolescents (Costello, Edelbrock, Dulcan, Kalas and Klaric, 1984).

It must be clear, in advance, that the research population is not representative for the general clinic and Day-care centre population, because of the specific selection criteria used. The 10 Day-care PI-children were all diagnosed as psychiatric disordered before age 4.0, which probably means that they are more severely disordered than the 110 PI-children recruited from the clinic. There is no documentation on the type of PI-children that are referred to the Medical Day-care Centre or the clinic and none on the medical situation, so that it is impossible to judge the representativity of the PI-population studied.

The following main classifications of internalizing and externalizing psychiatric disorders were used (see 1.2): Depression and Anxiety Disorder (internalizing disorders) as opposed to Oppositional Behavioural Disorder and Attention Deficit Disorder with Hyperactivity Disorder (ADHD) (externalizing disorders). Both Pervasive Developmental Disorder Not Otherwise Subscribed (PDD-NOS), characterised by a delay in development on all levels, and the classification 'No Diagnosis' implies that several psychiatric problems exist without one main classification being obvious (both symptoms of internalizing or externalizing disorders might be present) (Table 3.3). At the Day-care Centre the same main classifications were used after transforming the ICD-10 classifications into DSM-III-R classifications (APA, 1987).
Table 3.3  Number of PI-children with specific disorders per age group

<table>
<thead>
<tr>
<th>PI-children</th>
<th>Internalizing</th>
<th>Externalizing</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Depression</td>
<td>Anxiety</td>
<td>Oppositional behaviour</td>
</tr>
<tr>
<td>4 yrs</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>5 yrs</td>
<td>1</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>6 yrs</td>
<td>2</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>7 yrs</td>
<td>0</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>8 yrs</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>9 yrs</td>
<td>4</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>33</td>
<td>13</td>
</tr>
<tr>
<td>Total 120</td>
<td>41</td>
<td>32</td>
<td>25</td>
</tr>
</tbody>
</table>

A significant correlation between age and a specific psychiatric disorder (Mantel-Haenszel = 11.66183; df 1; p<.0064) was found; the older PI-children have relatively more internalizing disorders, especially Anxiety Disorder compared to the other categories. It was not possible to achieve an equal distribution of type of psychiatric disorder, since the project was dependent on the intake in the clinic and Day-care Centre.

When we correlate the different types of psychiatric disorder with the IQ-scores (WISC IQ Total, IQ Performal and IQ Verbal) we can observe a trend for significance (p<.10): the PI-children with PDD-NOS relatively have the lowest Performal IQ scores compared to the PI-children with other specific psychiatric impairments.

The Children’s Global Assessment Scale (CGAS) (APA, 1994) was used at the clinic in order to measure the global functioning of PI-children at home and at school. In the Netherlands, the CGAS score is the only assessment tool in every day practice that can give a reliable indication of the severity of the PI. Usually, further treatment procedures are based on the different scores: CGAS 1 (score 0 to 50) indicates serious symptoms of PI; CGAS 2 (score 50 to 60) indicates a moderate PI and CGAS 3 (score 61 to 70) indicates a mild PI. A CGAS score above 70 indicates normal functioning. The CGAS-scores of 105 PI-children were available and 15 were missing.

With respect to the 120 PI-children, 35 (33%) out of 105 PI-children with severe symptoms (CGAS 1) needed immediate treatment and some of them even needed to be taken into the clinic, since they showed serious impairments in social and school functioning. The 41 (39%) of the 105 PI-children with moderate symptoms (CGAS 2), showing impairments in social and school functioning, needed ambulatory treatment. This forms the group of out-patients. Only 29 (28%) of 105 PI-children were diagnosed as psychiatrically impaired, needing no direct treatment (CGAS 3).
They had some difficulty in social and school functioning. Most parents of these mildly disordered PI-children received some help in the form of an evaluation of their PI-children's functioning with one of the clinicians in order to learn to cope better with the abnormal social-cognitive behaviour of their child.

We found a significant correlation of CGAS outcome with age. We observed an almost linear decrease with age in CGAS 1/2 (severe/moderate symptoms) and an almost linear increase of CGAS 3 (mild symptoms) in 105 PI-children (p<.04). This means that the younger the PI-children, the more severe the symptoms of their psychiatric impairment were judged to be.

When we correlate CGAS scores with the three PI-categories (1) internalizing PI, (2) externalizing PI and (3) both internalizing and externalizing symptoms (see Table 3.3), no correlations were found. The following division proved to be more informative, since a significant correlation was observed between the CGAS and the following four different types of psychiatric impairment: (1) internalizing PI, (2) externalizing PI, and both (3) PDD-NOS and (4) 'No Diagnosis'.

Most PI-children with externalizing PI, especially those with ADHD (60%) and most PI-children with PDD-NOS (67%) had the most severe symptoms (CGAS 1). Most PI-children with internalizing PI, especially those with Anxiety Disorder (82%) had moderate/mild symptoms (CGAS 2/3). Most PI-children with 'No Diagnosis' (75%) had mild symptoms (CGAS 3). In sum, 76 (72%) of 105 PI-children need some form of therapy, especially the PI-children with ADHD and PDD-NOS, followed by the PI-children with Anxiety disorders.

### 3.2.3 Parental checklist and language test data

Language (dis)abilities can be detected in many different ways. We used a Parental Checklist (Blankenstijn and Scheper, 1993) and a language test (TvK, Van Bon and Hoekstra, 1982) in order to get insight in the language history of each individual PI-child and to collect information about the possible existence of receptive and productive LI.

#### Parental checklist

We developed a parental checklist, called Language Development Checklist (Gehoor-Communicatie-Spraak-Taal Oudervragenlijst; Blankenstijn and Scheper, 1993) (see Appendix 3a). This checklist contains 46 questions about the PI-children's development in the area of auditory abilities (8 questions), communication (15 questions), language (17 questions) and articulation (5) and 1 open question in order to elicit additional personal information about the PI-children's development in general. Unfortunately, no questions were asked about early language intervention or therapy. We only know that 10 four-year-old PI-children recruited from the Day-care Clinic receive language therapy. Each parent was asked to fill in this checklist at home, before the PI-child was language tested. Of the 120 PI-children the parents of 18 (15%) did not fill in this checklist, resulting in available etiologic information for 102 PI-children. On the basis of the checklist,

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1 We thank Daniëlla Polischenská for developing a database of the etiologic information in the parental checklists.
the parental respondents judged that 18 (18%) of all 102 PI-children had articulation problems, i.e. a language disorder in the area of phonology (see 1.2). In total, 49 (48%) of all 102 PI-children were judged as being language impaired (LI) in the area of morphology/syntax and semantics/pragmatics by their parents before referral to the psychiatric clinic (see for more details 15.2.1).

Language test data

The results of a language test were used as an index of language (dis)ability. As part of the standard and intake procedure of the clinic, all 120 PI-children were language tested with the Taaltests voor Kinderen (TvK; Van Bon and Hoekstra, 1982). This is one of the most frequently used standardized language tests in the Netherlands with norms based on over 1900 children from 4;0 to 10;0 years of age with appropriate reliability ranges. The children of the Medical Day-care Centre were also tested to make their data complete.

The number of PI-children that are deviant according to the five language subtests (TvK) are presented in Table 3.4. These subtests are differentiated into receptive (1, 2 and 3) and expressive language subtests (4 and 5). Within this differentiation of the subtests we ordered them from word level (1 and 4) to sentence level (2, 3 and 5). They cover the areas of morphosyntax (2, 5), morphosyntax/semantics (1, 4) and semantics/pragmatics (3). Pragmatics is underrepresented with only one receptive subtest. However, the test protocol is not only unclear about how to judge children as being language-impaired on the basis of low scores on one or more receptive and/or expressive subtests, but also about to what extent low subtest scores in any combination should contribute to the diagnosis 'language disorder'. Despite this classification problem, we will use the criterion that PI-children are diagnosed as language impaired (LI) when they have too low scores2 on one or more subtests.

Table 3.4 Number and percentage of PI-children diagnosed as LI based on the Taaltests voor Kinderen (Van Bon and Hoekstra, 1982)

<table>
<thead>
<tr>
<th>Language test</th>
<th>% LI in 120 PI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receptive subtests</td>
<td></td>
</tr>
<tr>
<td>Word level</td>
<td></td>
</tr>
<tr>
<td>(1) lexical choice (WSK)*</td>
<td>17 (14%)</td>
</tr>
<tr>
<td>Sentence level</td>
<td></td>
</tr>
<tr>
<td>(2) judgement grammaticality (ZBBK; ZBB1;ZBB2)</td>
<td>17 (14%)</td>
</tr>
<tr>
<td>(3) implicit meaning (VB)</td>
<td>14 (18%)*</td>
</tr>
<tr>
<td>Expressive subtests</td>
<td></td>
</tr>
<tr>
<td>Word level</td>
<td></td>
</tr>
<tr>
<td>(4) lexical production (WSP)</td>
<td>8 (7%)</td>
</tr>
<tr>
<td>Sentence level</td>
<td></td>
</tr>
<tr>
<td>(5) sentence production (ZBP)</td>
<td>18 (16%)</td>
</tr>
</tbody>
</table>

* the abbreviation between brackets indicate the Dutch subtest labels
** 14 calculated over 77 PI-children

2 A standard score of 3.0 and below indicates abnormal language performance on the specific language subtests (TvK; Van Bon and Hoekstra, 1982).
The results on the receptive language subtests on word level indicate that 17 (14%) of the 120 PI-children have a disorder in making receptive lexical choices (matching one word meaning with one picture out of four). They have many failures (match a word with a wrong picture) and seem not to understand the meaning of words that should have been acquired according to their age. Thus, their lexicon probably is restricted.

The results on the receptive language subtests on sentence level show that comparably 17 (14%) of all PI-children have a disorder in their ability to judge what is a correct morphological/grammatical sentence in Dutch. These PI-children thus also have difficulties in identifying morphological/syntactic errors. When we look at pragmatics, we first have to mention that for reasons of time, age and attention deficits, the receptive subtest (3) that tests the ability to infer implicit meaning in single sentences was not performed by 43 PI-children. We see that 14 (18%) of 77 PI-children have a disorder in inferring implicit semantic/pragmatic meanings within sentences.

When we look at the combination of receptive difficulties, we observe that no PI-children have deviant scores on all receptive subtests (1, 2 and 3); 10 (8%) PI-children had deviant scores on two out of three subtests in any combination; 24 (20%) PI-children had deviant scores on only one subtest (1, 2 or 3). These last two groups thus contain 34 PI-children, i.e. 28% of the 120 PI-children, that have a receptive language disorder on word and sentence level in the area of semantics (1), morphology/syntax (2) or pragmatics (3).

The results on the productive language subtests on word level indicate that a very small number (8; 7%) of all PI-children have difficulties in naming pictures, indicating a productive semantic language disorder related to a limited vocabulary. The results on the productive language subtests on sentence level show that 18 (16%) of all PI-children have difficulties in sentence production. Only 6 (5%) PI-children had deviant scores on all productive subtests (4 and 5), whereas 13 (11%) PI-children had deviant scores on one out of the two productive subtests (4 or 5). We computed that 19 PI-children, i.e. 16% of the 120 PI-children, fall out on one or more productive subtests and are detected as having a productive language disorder on word and sentence level in the area of semantics and morphology/syntax.

3.3 Description of subjects: normally developing children

In 1993 Roelofs (1998) collected language data from 75 Dutch normally developing children (42 girls and 33 boys), equally divided over the age groups 4;0 to 8;0 years. The N-children were recruited from three different schools (two school with mainly children with middle Socio-Economic Status (SES); one school with mainly children with lower SES; Roelofs, 1998:63) in the west urban region of the Netherlands (North-Holland), including pupils from a range of social backgrounds. In consultation with the teacher the N-children were selected according to the following criteria:

(1) age range 4;0-4;6 to 8;0-8;6 years
(2) monolingual Dutch
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(3) no overt educational, psychological and social problems
(4) able to carry out research tasks

Children were not included if they had a known history of language delay, or social-cognitive problems, although other additional language/psychological test data were not available (Table 3.5).

Table 3.5  
Age groups, total number of N-children per age group, mean age per age group and total number of girls and boys per age group (Roelofs, 1998)

<table>
<thead>
<tr>
<th>Age groups</th>
<th>N=75</th>
<th>mean age</th>
<th>Girls</th>
<th>Boys</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 yrs</td>
<td>15</td>
<td>4.4</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>5 yrs</td>
<td>15</td>
<td>5.3</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>6 yrs</td>
<td>15</td>
<td>6.2</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>7 yrs</td>
<td>15</td>
<td>7.2</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>8 yrs</td>
<td>15</td>
<td>8.3</td>
<td>8</td>
<td>7</td>
</tr>
</tbody>
</table>

The 75 Dutch-speaking N-children from the Roelofs-population are judged to be representative for the group normally developing children in general since they were in regular educational settings. Parental permission was necessary to let the child participate in the project. In total 8 N-children had to be excluded: 6 dropouts were caused by illness, non-co-operative behaviour, an inability to carry out research tasks or by a defect of audio-visual equipment; 1 drop-out was judged as language disordered; and 1 had hearing problems (Roelofs, 1998).

The 240 Dutch-speaking N-children from STAP-population were recruited from different schools in Amsterdam, also located in the west urban region of the Netherlands (North-Holland), including pupils from a range of social backgrounds and according to similar selection criteria as the Roelofs-population. The N-children from the STAP-population were also equally divided over the age groups 4;0 to 8;0 years (Van den Dungen and Verbeek, 1994, 1999; see also 4.3).

3.4 Language Assessment

Spontaneous language data were gathered in two settings: a narrative (narrative genre) and a semi-structured interview (conversational genre). In general the language problems in children are more obvious in such complex settings compared to language testing (McTear and Conti-Ramsden, 1992; Smith and Leinonen, 1992). The two settings are not only exploring more complex language behaviour than elicited by language tests, but also give more insight in problems with verbal communication in everyday life. It is difficult to decide whether the interview is a more complex language task than the narrative. In the conversational genre PI-children might be guided by the interviewers, but they have to plan language information in a creative way and therefore can experience some psychosocial
stress. Conversely, in the narrative genre PI-children can be helped by the pictures that trigger the language information, despite the fact that they have to tell the whole story on their own.

3.4.1 Narrative

In order to elicit the narrative, the child was invited to look at the picture book 'Frog, where are you?' (Mayer, 1969), frequently used in cross-linguistic research (Berman and Slobin, 1994). A short summary of the 24 picture book follows (see also Trabasso and Rodkin, 1994:85-86; Appendix 3b):

'This is a story about a little boy who had a pet dog and frog in a jar. One evening, the boy, dog, and frog were in the boy's bedroom. The boy and the dog went to sleep and while they were sleeping, the frog escaped from its jar. The next morning the boy and the dog woke up and found the empty jar. The boy was upset and tried together with the dog to find the frog. First, they were searching inside the room. Accidentally the dog fell out of the window. Thereafter they were searching for the frog outside. But in each place the boy and dog searched, they found nothing or encountered a different animal. Finally, a deer accidentally carried the boy to a pond being challenged by the dog. They found the frog, being in love with a female frog, accompanied by little frogs. The story ended with the boy taking home the frog or a baby frog, being followed by the dog.'

Children were first asked to look through the entire book, and then to tell the story while looking at the pictures. We gave them the following instructions:

'Here is a picture book. This book tells a story about a boy [point to picture on cover], a dog [point], and a frog [point]. First, I want you to look at all the pictures. Afterwards you look at the pictures again and tell the story to me. I do not know the story.'

The influence of the investigator was minimized. Younger children were sometimes helped with turning the pages. The following neutral prompts were used: silence, nod of head, 'okay' and 'yes'. Less neutral prompts were occasionally necessary, like 'and then?' and 'what happened next?'. The elicitation procedure used is comparable to Berman and Slobin (1994) and Roelofs (1998).

3.4.2 Conversation

In order to collect spontaneous language data, we interviewed the children in a semi-structured interview, according to a Dutch language analysis procedure STAP (Van den Dungen and Verbeek, 1999). This is a standardized diagnostic instrument for children from 4;0 to 8;0 years. The STAP procedure is based on spontaneous conversation with a researcher unfamiliar to the child and involves topics outside the here-and-now. The interviewer has to ask open questions as much as possible about everyday events. Typical subjects are pets, brothers and sisters, school, friends, sport, holiday and home activities. Television programs, films, computer programs
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or books are avoided, as it is known that these topics are relatively difficult to talk about, especially for younger children (see also Roelofs, 1998). The ST AP is suitable to diagnose children as having expressive language disorders in the areas of morphology/syntax and semantics/pragmatics (see Appendix 3c). The focus is on grammaticality and morphosyntactic complexity; only 2 variables involve semantics and 3 pragmatics. Global language measures, such as mean length of utterance (MLU), mean total number of elliptical answers or the mean number of unintelligible utterances are also included. We used part of this linguistic model of analysis to describe the morphological/syntactic disorders of the 120 PI-children (see Chapter 4).

Both narrative and conversational data were collected in a one-hour session (see also Roelofs, 1998:64), each child being audio- and video-taped in a special testing room. One of the investigators sat face-to-face and opposite to the child, while the other was running the camera. We used the Child Language Data Exchange System (CHILDES) to transcribe and analyse the (non)linguistic data from a time-coded video. A selection of the transcription notation conventions in the Codes for the Human Analysis of Transcripts (CHAT) were used (MacWhinney, 1995). The transcription and segmentation conventions were mainly based on ST AP (Van den Dungen and Verbeek, 1999) together with additional conventions related to nonverbal behaviour (Blankenstijn, Roelofs and Scheper, to appear). Transcription was in standard orthography, although non-standard forms of words were also transcribed, such as clitics, phonological, dialectal- or sociolectic variants.

3.5 Morphological/syntactic and semantic/pragmatic models of analysis

We developed different models of analysis to investigate the morphological/ syntactic abilities (Schepers, 1996) and the semantic/pragmatic abilities (Roelofs, 1996; Blankenstijn, 1996) of the PI-children in comparison to N-children (Roelofs, 1998) in both conversation and narrative. Approximately, 25,000 T-units (see 4.1) (divided in 30,000 clauses) and 30,000 communicative contributions of both N- and PI-children were collected and scored in both the conversational and narrative genre. In the interview genre, approximately 10,000 communicative contributions of the N- and PI-interviewers were also analysed. We did not exclusively explore morphological or semantic abilities, but only those morphological abilities most closely connected to syntax and only those semantic abilities most closely connected to pragmatics in both genres.

We divided the morphological/syntactic component of language in two parts, the grammatical form and the complexity of morphological/syntactic categories in order to evaluate the type of morphological/syntactic impairment. Within these categories a differentiation is made into lexical (nouns, verb and adverbs) and functional categories (e.g. determiners) to observe the type of morphological/syntactic problem that might be presented in the PI-children (e.g. Chomsky, 1986; Clahsen, 1989, 1992) (see 4.1).
Following Roelofs (1998), we divided the semantic/pragmatic component of language used in conversation into three parts with respect to the structure (turn taking abilities; adjacency pairs and episodes), function (speech acts and their form), content (topic management; coherence and cohesion). The semantic/pragmatic component of language used in narrative was predominantly related to the content (plot management; cohesion) in order to evaluate the type of semantic/pragmatic impairment (see 10.1).

A morphological/syntactic error or marked unit with respect to the morphological/syntactic complexity has a negative impact on the information transmission at the semantic/pragmatic level. If no morphological/syntactic problems exist, there still might be problems in the area of semantics/pragmatics. Therefore, we integrated the two models of analysis at different points, for example with respect to the semantic/pragmatic effect of missing arguments. In order to gain insight in possible differences in language capacity related to a specific genre, we compared PI-children's capacities in the two genres: most morphological/syntactic results on the level of grammatical form and complexity are compared in both genres, whereas only the results of conjunctive cohesion and referential cohesion are compared in both genres on the semantic/pragmatic level of analysis.

In general, language errors were analysed in four steps. These steps are worked out by making morphological/syntactic and semantic/pragmatic paraphrases following the flow-chart developed by Roelofs (1996, 1998:202) (Appendix 3d). Making a paraphrase is adding, leaving out or changing words or sentences in order to explicate the 'ideal' message the child aims at, while staying as close as possible to the actual erroneous communicative contribution. The four steps are:

1. **Identification** of the error

2. **Comparison** between the error and the 'ideal' language unit(s) according to the spoken adult target language

3. **Classification** of the error. Each error was categorized as an error in the area of morphology/syntax or semantic/pragmatics, although some errors at the interface between language areas could be counted as both (Bloom and Lahey, 1978:22)

4. **Evaluation** of the error. Each error was evaluated with reference to its morphological/syntactic and semantic/pragmatic consequences in the communicative setting in which it occurs

The classification of language behaviour as morphological/syntactic or semantic/pragmatic LI on the basis of the spontaneous language analysis is discussed in more detail in the following subsections (see 3.5.1 and 3.5.2).
3.5.1 The classification of morphological/syntactic LI based on spontaneous language analysis

With respect to the analysis of morphology/syntax a group comparison on the most general level was possible. The instrument used, STAP (Van den Dungen and Verbeek, 1999), makes it possible to classify children as morphologically/syntactically disordered related to based on deviant z-scores on two general production variables: ungrammatical sentences and grammatical errors (see 4.2). On the basis of a deviant score on one of these general variables a child is classified as LI.

There are further 23 subvariables (see Appendix 3c) that specify ungrammaticality. The STAP spontaneous language protocol is also clear on how to judge children as being language-impaired on the basis of deviant scores on one or more of these 23 subvariables. The subvariables are not hierarchically ordered in terms of their negative effect on communication. Errors in one area of morphology/syntax are judged as being equally disturbing as errors in other areas of morphology/syntax. According to STAP, all subvariables thus equally contribute to ungrammaticality, although this is highly debatable. A relatively infrequent morphological/syntactic error could be more serious than relatively many morphological/syntactic errors of another type. The diagnosis LI cannot be based at this point in time on a deviation in one single subvariable. In the future, more research is needed to classify deviances in different areas of morphology/syntax on a scale of severity related to age.

As pointed out above, in addition to the STAP variables an even more finely-grained model of morphological/syntactic analysis (Scheper, 1996) was used to investigate the morphological/syntactic abilities of the PI-children. This model contains even more detailed subvariables that mostly fall under the subvariables of the STAP. However, since the STAP did not examine such variables, a comparison with the 240 N-children from the STAP-population was not possible. A comparison was therefore made with a selection of the 75 N-children from the Roelofs-population. This more detailed analysis may contribute to the proposed development of the LI scale mentioned above that is needed to detect the morphological/syntactic symptoms in the PI-population.

3.5.2 The classification of semantic/pragmatic LI based on spontaneous language analysis

Since a comparison between the PI-children with the N-children from the STAP-populations following the STAP-norms (Van den Dungen and Verbeek, 1994, 1999) results in 100% semantic/pragmatic disorder in the 120 PI-children, this analysis procedure proved to differentiate insufficiently.

The STAP-procedure has five general measures to classify children as semantic/pragmatic disordered. These variables are moderate and severe semantically marked utterances, implicit reference and moderate and severe pragmatically marked utterances (Van den Dungen and Verbeek, 1994, 1999) (Appendix 3c). These variables, however, were found to be unclear and incomplete. Firstly, the different types of semantic and pragmatic errors mentioned in STAP under the general variables form only a very small part of the types of errors that can be classified. For
example, interruptions (see 10.6) are not included. Secondly, with respect to the variable implicit reference, some implicit referents are scored under this heading, whereas other types, for instance, the use of definite NP's or the use of proper names in the conversational interview genre (see 13.5), are scored as incorrect under the heading of 'pragmatically marked utterance'. The boundaries between different instances of unclear reference assignment therefore proved to be too unclear (Hickmann, 2003). Furthermore, it is debatable whether the use of implicit reference should be considered as a general pragmatic measure. Thirdly, the boundary between semantically/pragmatically impaired and normal language behaviour is very thin. For instance, one severe semantic/pragmatic error that causes unintelligible information in a STAP interview is enough to diagnose a four- to eight-year-old child as semantically/pragmatically impaired (Van den Dungen and Verbeek, 1994, 1999). Therefore, the STAP procedure proved to be insufficient suited to assess semantic/pragmatic LI.

A new, more finely-grained semantic/pragmatic analysis procedure was needed. Before such an assessment tool could be developed, however, more information about the semantic/pragmatic development of normally developing Dutch-speaking children was needed. Roelofs (1996, 1998) created such a semantic/pragmatic model of analysis in order to describe the pragmatic development of Dutch-speaking normally developing children. We used this model to detect semantic/pragmatic LI in the 120 Dutch-speaking PI-children. The subvariables used in this semantic/pragmatic model (Roelofs, 1996, 1998) are not the same as the five general semantic/pragmatic measures used by STAP. Roelofs (1998) did not include a general measure for semantic/pragmatic LI, such as the number of semantically/pragmatically incorrect sentences or the total number of semantically/pragmatically errors. Individual variables are used to determine a problem in this area.

In the future more research is needed to classify deviancies in different areas of semantics/pragmatics based on these more specific Roelofs-(sub)variables. This can be done in a similar way to that was used for the STAP procedure, where only the 23 most informative subvariables were finally selected to determine the morphological/syntactic LI.

The different LI-symptoms out of all the Roelofs-(sub)-variables that proved to contribute to the semantic/pragmatic LI-symptoms in PI-children can be a first step towards the development of a new assessment tool to identify semantic/pragmatic disorder. A general measure for semantic/pragmatic LI should be included, for instance, the 'total number of semantically/pragmatically marked/incorrect utterances'. Since most researchers only investigate either morphological/syntactic abilities or semantic/pragmatic abilities, no model of analysis exists that integrates these two areas. In the future, such a model should be developed.

A description of both morphological/syntactic (dis)abilities and semantic/pragmatic (dis)abilities in 120 PI-children enables us to compare the language abilities of our research population with children that are Specific Language Impaired (grammatical SLI) (Van der Lely, 1993, 1994; Leonard, 1998) on the one hand and with children who are Semantic-Pragmatic Impaired (Bishop and Adams, 1989) or Pragmatic Language Impaired (PLI) (Bishop, Chan, Adams, Hartley and Weir, 2000) on the
other hand. On the basis of this comparison, we might find evidence for the existence of specific morphological/syntactic and/or semantic/pragmatic (dis)abilities exclusively observed in PI-children or not.

### 3.6 Statistical analysis

The models of analysis were developed first and the interrater reliability of the main variables (and subvariables) were tested on small subgroups of the total population of PI-children (Appendix 3e). Blankenstijn, Roelofs and Scheper established sufficient interrater reliability for the main language transcription and segmentation variables. Roelofs and Blankenstijn established the interrater reliability for the semantic/pragmatic variables in both genres. Scheper established sufficient percentages of agreement (see Baker, De Geus, Van Amstel, Gosselaar, Schuijt, Ursem, Verkoeijen and De Wijckerslooth, 1998) or interrater reliability for the main morphological/syntactic variables (Schuijt, 1999) in both genres. We used the corrected Cohen's Kappa (see Van den Brink and Koele, 1985, 1986, 1987; Brennan and Prediger, 1981) most frequently as the measure of interjudge agreement. For the segmentation and some of the morphological/syntactic variables with regard to the conversational genre percentages of agreement were used. For the MLU the Pearson's product-moment correlation coefficient (PMC) was calculated with the use of SPSS/PC+.

According to the Explanatory Criterion (Burisch, 1984) that uses significant group-effects to classify deviant behaviour from normal behaviour, the selected Morphological/Syntactic (MS) and Semantic/Pragmatic (SP) variables are used to explore whether there exist significant differences between the PI and the N-children.

As statistical methods used in order to measure predominantly group- and age-effects in the linguistic performance of 120 PI-children compared to 75 N-children, we mainly used analysis of variance (ANOVA's, ANCOVA's, MANOVA), Chi-square, Pearson's product-moment-correlation (pmc) coefficient, Fisher's Exact Test or a Binomial test (Van den Brink and Koele, 1985, 1986, 1987). Generally, the ANOVA is designed to be sensitive to differences among the means of the groups under study. In order to avoid spuriously inflating the number of significant results, we developed where possible a hierarchical coding system of subordinate coding categories for the general variables that represent differences between appropriate versus inappropriate morphological/syntactic and semantic/pragmatic language abilities. We tried to define mutually exclusive general variables.

If a significant main effect for age or a group*age interaction effect was found, post hoc trend analyses using one-way ANOVA or ANCOVA were executed to examine the linearity of the age-effect in both populations. Additionally, we used a Factor analysis (Van den Brink and Koele, 1985, 1986, 1987) in order to find specific types

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3 We would like to thank our colleague Marja Roelofs, the students of the research group 'First Language Acquisition': Krista de Geus, Mariët van Amstel, David Gosselaar, Janet Ursem, Jesse Verkoeijen and Gerije de Wijckerslooth and especially Stephanie Schuijt for their time and effort in establishing the interrater reliability.
of 'language impairment profiles' in relation to specific types of psychiatric disorder, divided into internalizing and externalizing disorders.

We frequently checked significant F-values using the non-parametric Kruskal-Wallis test for independent groups, as suggested by Craig and Evans (1993), but since this always confirmed our findings with other statistical measures, we will not report the results.

We carried out a common Factor analysis followed by Varimax rotation (Gorsuch, 1983; Van den Brink and Koele, 1987:50) was used in order to explore structural relations between the variables representing differences between appropriate versus inappropriate morphological/syntactic and semantic/pragmatic language abilities. The result of the Factor analysis, i.e. more or less separate, specific dimensions of LI, were used to identify extreme LI in specific types of psychiatric disorder.

3.7 Specific research questions

We addressed the following specific research questions based on the main research questions (see 2.5):

Subquestions under main research question 1a:

Subquestion 1a1
To what extent do Dutch-speaking PI-children have problems with morphology/syntax related to the grammatical form and complexity of lexical and functional categories in both genres? (Chapter 4)

Subquestion 1a2
Which morphological/syntactic disabilities related to the grammatical form and complexity of lexical categories (lexical verbs, argument structure, prepositions and adverbs) and functional categories (tense and agreement marking) are characteristic of Dutch-speaking PI-children in both genres? (Chapters 5 to 8)

Subquestions under main research question 1b:

Subquestion 1b1
To what extent do Dutch-speaking PI-children have problems with semantics/pragmatics with respect to the structure (turn taking ability), function (responsiveness) and content (topic management, coherence and cohesion) in the conversational genre and content (plot management and cohesion) in the narrative genre? (Chapters 10 to 13)

Subquestion 1b2
Which semantic-pragmatic (dis)abilities are characteristic of Dutch-speaking PI-children with respect to the structure (turn taking ability), function (responsiveness) and content (topic management, coherence and cohesion) in the conversational genre and content (plot management and cohesion) in the narrative genre? (Chapters 10 to 13)
Subquestions under main research question 2

Subquestion 2a
Is there a difference in performance at the level of morphology/syntax related to the grammatical form, temporality, transitivity, agreement marking and morphosyntactic packaging comparing the two genres, conversation and narrative? (Chapter 9)

Subquestion 2b
Is there a difference in co-referential cohesion at the level of semantics/pragmatics comparing the two genres, conversation and narrative? (Chapter 14)

Subquestion under main research question 3
Is there a relationship between specific profiles of 'morphological/syntactic and semantic/pragmatic impairments' with specific psychiatric disorders, such as internalizing and externalizing disorders? (Chapter 15)
4 The ability to produce grammatical utterances: grammaticality in general

Annette Scheper

4.1 Introduction

Acquiring the morphological/syntactic rules of Dutch grammar is part of the task that Dutch-speaking children are faced with when acquiring their mother tongue. Morphology is the system of the smallest meaningful units of language which can either stand alone as a word form or be bound to another unit to add meaning, whereas syntax is the rule system used in constructing sentences. It is the rule system that governs the use of morphemes and word order (Haegeman, 1991).

Normally developing Dutch children are still developing their morphology/syntax or grammaticality between the ages of four and six years (e.g. Schaerlaekens and Gillis, 1987; Van den Dungen and Verbeek, 1994, 1999; Krämer, 1995; Wijnen, 1995, 1998; Bol, 1996; Verhulst-Schlichting, 1996; Verrips, 1996; Gillis and Schaerlaekens, 2000).

The general picture for normal syntactic development is that children's utterances become longer as children grow older. Gillis and De Houwer (1998:49) state that Dutch children gradually diversify their use of clause and noun phrase constituents, but not at the expense of previously occurring elements: there seems to be a general addition operation, rather than a replacement one. Similarly, the development of verb and noun phrases starts with a limited repertoire that is gradually expanded. Complex verb and noun phrases start to be used in addition to simple ones, accompanied by a gradual diversification in the types of elements that occur in these verb and noun phrases.

When acquiring the grammatical rules of Dutch, children make grammatical errors, but as the children grow older, the frequency of errors should decrease. For example, children have to learn that words belong to different syntactic categories, such as nouns, verbs, etc., and that the syntactic category to which a word belongs determines its distribution, that is in what context it can occur. They have to learn that one cannot easily interchange words of one category for words of another, as this mostly results in ungrammatical sentences. Children also have to acquire which syntactic categories are obligatory within Dutch as a verb-second language with an underlying Subject-Object-Verb order and which morphological adjustments between verbs, nouns and prepositions are necessary (e.g. Gillis and De Houwer, 1998) (see for a more detailed explanation Chapter 6).

After the age of six, the grammatically marked utterances in the discourse have to decrease to 'normal' proportions that is as produced by adults (Van den Dungen and Verbeek, 1994, 1999). Spontaneous language is always more coloured by a certain degree of ungrammaticality than, for example, the language spoken to announce the daily news on radio or television. Children might occasionally speak ungrammatically for the same reasons that adults occasionally do, for example, when they do not take enough time to plan their message (Hsu and Hsu, 1996). Clearly, children should not be expected to be any less error-prone than adults, but –
to the extent that their processing or performance abilities are more limited than those of adults – children might make more grammatical errors than adults. The impact of ungrammatical utterances in the discourse should be so small, however, that the communicative message remains fully understandable most of the time.

It is important for language acquisition theory to explore the exclusiveness of specific morphological/syntactic phenomena in specific populations, such as in children with a psychiatric disorder. As described in Chapter 1, research has indicated that a high percentage of PI-children have problems with language (Cantwell and Baker, 1987; Cohen et al., 1989; Prizant et al., 1990). Although pragmatic difficulties are generally observed in PI-children, some researchers have shown that PI-children with internalizing or externalizing disorders have lower expressive syntactic scores than their normally developing peers (e.g. Cantwell, Baker and Rutter, 1978; Stevenson et al., 1985; Miniutti, 1991; Warr-Leeper, Wright and Mack, 1994). Stevenson and colleagues (1985) even concluded that deficiencies in expressive syntax were severe enough to be a significant marker, predicting subsequent externalizing PI. Also PI-children with Autistic Disorder and PDD-NOS, a disorder on the autistic spectrum, show severe language problems at the level of morphology/syntax alongside semantic/pragmatic problems (Van Berckelaer-Onnes, 1992, 1997). An explanation for the occurrence of externalizing disorders is the inability to process information through the auditory modality (e.g. Mattison, Cantwell and Baker, 1980; Zinkus and Gottlieb, 1983; Cantwell and Baker, 1985). Auditory processing impairments have been found in PI-children, particularly in children with ADHD and PDD-NOS (Westby, 1999; see 2.2; 2.3.1) and might lead to morphological and syntactic problems.

Detailed morphological/syntactic analyses of spontaneous language in the conversational and narrative genre have not yet been carried out in relation to psychiatric disorder. Frequently, only language test results were used to classify morphological/syntactic disorders (see 1.2.3).

The Dutch pilot studies for this research have shown that PI-children have problems with realizing syntactic categories in a semi-structured interview as part of the conversational genre. They also make more morphological/syntactic errors than their age-peers. Characteristic for these PI-children is the lack of obligatory morphological/syntactic information and errors of form. Furthermore, the utterances produced by these PI-children reflect low complexity (Ran and Smits, 1990; Mills and Tso, 1991). It was also noticed that – consequently – the frequent use of morphologically/syntactically marked or ungrammatical utterances mostly had a negative influence on the communicative interaction. These utterances were often judged as being not properly informative and therefore difficult to understand for the conversational partner. It was concluded that the morphological/syntactic problems can occur in isolation, but also often co-exist with problems in the level of semantics-pragmatics (Kolthoff, 1989; Ran and Smits, 1990; Mills and Tso, 1991). In these pilot-studies only a small group of PI-children was studied and only general measures were used to describe the morphological/syntactic skills. From these results it is not clear how specific aspects of morphology and syntax are affected in
PI-children and whether they show a retarded or atypical morphological/syntactic development (see 1.1).

However, on the basis of the diagnostic criteria for the types of PI-children we are studying, we should expect to find clear morphological/syntactic difficulties alongside the better-known semantic/pragmatic difficulties in PI-children (e.g. Westby, 1999). Among the diagnostic criteria for identifying PI-children with ADHD are for example: (1) difficulties in sustaining attention in tasks or play activities, (2) easily distracted by extraneous stimuli and (3) excessive talking (APA, 2000). The ability to be attentive and motivated, both part of MAM, are prerequisites for performing a behavioural (language) task in a goal-oriented way (Westby and Cutler, 1994). We already explained in 2.3.1 that executive dysfunctioning causes interrelated impairments in both PI and LI in a child. PI-children with executive dysfunctioning miss subtle cues in conversation, interrupt others, change topics, and lose their focus, reflecting difficulties in the area of semantics/pragmatics. However, executive functioning deficits may also lead to general difficulties in organizing language production and processing incoming language, leading to problems in the area of morphology/syntax. More precisely, a child that cannot keep his attention on (language) tasks or activities might likely produce fragmented sentences with missing obligatory information. In turn, excessive talking could cause, for example, absence or errors in the fine-tuned ability of establishing connectivity within T-units1 or between T-units in extended discourse. To conclude, morphological/syntactic and semantic/pragmatic difficulties might co-occur in PI-children with ADHD.

The main question of this chapter is to what extent the 120 Dutch-speaking PI-children have problems with morphology/syntax in conversation. To gain a deeper insight into the conversational abilities of these children a detailed error and complexity analysis of the morphology and syntax is carried out. With both types of analysis the severity and type of morphological/syntactic disorder can be diagnosed. Furthermore, the morphological/syntactic analysis is divided into two parts, the grammatical form and the complexity of utterances. The analysis related to the grammatical form is divided into an analysis of lexical categories as opposed to functional categories (Chomsky, 1986). This distinction seems to be particularly relevant, since some research indicated that SLI-children seem to have more problems with the realization of functional than with lexical categories (e.g. Clahsen, 1989, 1992; Leonard, 1998). However, research has indicated that the grammatical problems of SLI-children also involve the use of lexical categories as related to the argument structure (e.g. Rice, 1996; Leonard, 1998; De Jong, 1999; see 1.2).

We know that many LI-children show uneven profiles, i.e. they may resemble younger N-children in some aspects of language use but not in others (Leonard, 1996:298). These uneven profiles can differ in groups of LI-children. It is assumed

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1 T-unit is an abbreviation of 'Terminable unit', that is a main or independent clause with all its modifiers and subordinate clauses (Hunt, 1970:4). A STAP interview is finished when 50 T-units are expressed by the child. The variables 'ungrammatical T-unit' and 'grammatical error' are analysed in these 50 T-units according to STAP (Van den Dungen and Verbeek, 1994, 1999).
that there is a group of SLI-children that show only impairment in the area of morphology/syntax, so-called Grammatical SLI-children (G-SLI) (e.g. Rice, 1993; Van der Lely, 1994). Semantic-pragmatic disorders tend to co-occur with autistic features (Rapin, 1996; Bishop, 1998; Bishop, Chan, Adams, Hartley and Weir, 2000; see 1.2). However, some research has identified children who do not meet the diagnostic criteria for autism but do show semantic-pragmatic disorders (SP-SLI-children) (Rapin, 1996; Conti-Ramsden, Crutchley and Botting, 1997). Bishop (1989; 1998) even distinguishes a group of children with Pragmatic Language Impairment (PLI), a disorder that is intermediate between autistic disorder and SLI. Recent Dutch research shows that children with Specific Language Impairment have a significantly increased risk for developing behavioural problems at an older age, i.e. from the age of eight years (Coster, 2002).

Children with Williams' Syndrome, a rare neurodevelopmental disorder, are often used as a prime example for the modularity of an innate faculty for morphological/syntactic rules: these children are characterized by serious cognitive deficits alongside intact language (see 2.2 and 2.3.2). However, recent research has shown that Williams' Syndrome children show some clear morphological/syntactic problems, suggesting that the notion of spared, modular, language capacities in Williams' Syndrome should be further discussed (Karmiloff-Smith, Grant, Berthoud, Davies, Howlin and Udwin, 1997).

It is possible that the morphological/syntactic profiles can also vary in specific types of PI-children. A more detailed morphological/syntactic analysis will shed light on relationships between specific morphological/syntactic problems in specific diagnostic groups of PI-children (see 3.2.3).

We want to determine whether the PI-children especially have difficulties in the area of morphology/syntax in the realization of functional or lexical categories or both in the conversational and narrative genre (Chapter 4 to 9). The first part of the complete morphological/syntactic analysis is related to the grammaticality of utterances and the second part to the complexity of the utterances. Table 4.1 presents all the specific morphological/syntactic variables used in the complete analysis of grammatical form and complexity of morphosyntax in the conversational genre (see Chapter 4 to 8).

With respect to the narrative genre, we carried out a comparable analysis including the variables related to grammaticality, temporality, transitivity, agreement and morphosyntactic packaging (see Chapter 9). Each morphological/syntactic variable will be discussed in the following chapters. In Table 4.1, the numbers 4 to 9 refer to the specific chapter that presents the results of a specific variable. Each section contains a motivation of the specific linguistic variable on which the research question(s) are formulated. Then the research variables are defined and operationalised and the results related to a specific morphological/syntactic variable are presented. Each section will be rounded off with concluding remarks.
Table 4.1  The complete set of morphological/syntactic variables for grammatical form and complexity in the conversational and narrative genre

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Type of analysis</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Production of grammatical utterances</td>
<td>Error-analysis</td>
<td>Total number of Ungrammatical T-units, Total number of Grammatical errors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clustering of Grammatical errors</td>
</tr>
<tr>
<td>5 Realization of lexical categories</td>
<td>Error-analysis</td>
<td>(Un)grammatical missing subjects and objects Missing Preposition Missing Adverbial phrases</td>
</tr>
<tr>
<td>6 Ungrammatical use of lexical categories</td>
<td>Error-analysis</td>
<td>Wrong lexical choice of Preposition Wrong lexical choice of Adverbial (phrase) Word order errors</td>
</tr>
<tr>
<td>7 Ungrammatical use of functional categories</td>
<td>Error-analysis</td>
<td>Tense marking: Incorrect Paste tense marking Agreement marking: Incorrect Subject-Verb Agreement Incorrect Determiner-Noun Agreement</td>
</tr>
<tr>
<td>8 Morphological/syntactic packaging</td>
<td>Analysis of</td>
<td>Mean Length of Utterance (MLU) Mean Length of 5 Longest Utterances (MLUL)</td>
</tr>
<tr>
<td></td>
<td>complexity</td>
<td>Morphosyntactic packaging by the use of: Clausal ellipsis Conjunction reduction constructions Embedded clauses Transitivity by the use of: Obligatorily Object verbs Optionally Object verbs Intransitive verbs Copula verbs Transitivity by the use of: Split or Particle verbs Light or GAP verbs</td>
</tr>
<tr>
<td>9 Genre comparison conversation / narrative</td>
<td>Error-analysis</td>
<td>Total number of Ungrammatical clauses Total number of Grammatical errors</td>
</tr>
<tr>
<td></td>
<td>and Analysis of</td>
<td>Temporality by the use of: Number of missing lexical verbs Correct use of past tense Incorrect past tense marking Transitivity by the use of: Obligatorily Object verbs Optionally Object verbs Intransitive verbs Copula verbs Ungrammatical missing subjects and objects Agreement relations by the use of: Incorrect subject-verb agreement Incorrect determiner-noun agreement Morphosyntactic packaging by the use of: Discourse topic drop Conjunction reduction constructions Embedded clauses</td>
</tr>
</tbody>
</table>
4.2 Ungrammatical T-units and Grammatical Errors

4.2.1 Research questions, definitions and operationalisations

Our main question in this section is to what extent the 120 PI-children have problems with morphosyntax in terms of grammatical form in general as compared to normally developing children, either the N-children from the Roelofs-population (1998) or the STAP-population (1994). Therefore, we want to answer the following questions: is the number of ungrammatical T-units and grammatical errors in interviews with PI-children comparable to the amount in interviews with N-children? And, is there comparable development with age?

Problems with 'grammaticality' are defined as a significantly high number of ungrammatical T-units and/or a significantly high number of grammatical errors compared to normally developing children, according to STAP (Van den Dungen and Verbeek, 1994, 1999). Of these two variables the former is the stricter criterium in grammaticality, since a large number of errors can be produced in a few T-units, whereas if a large number of T-units is affected, then the morphological/syntactic problem is more widespread. The term 'T-unit' is an abbreviation of 'Terminable unit', that is a main or independent clause with all its modifiers and subordinate clauses (Hunt, 1970:4). A STAP interview is finished when 50 T-units are expressed by the child. The variables 'ungrammatical T-unit' and 'grammatical error' are analysed in these 50 T-units according to STAP (Van den Dungen and Verbeek, 1994, 1999).

As morphological/syntactic abilities develop with age, younger children should produce more ungrammatical T-units and make more grammatical errors than the older ones. What we have to find out is whether PI-children show a similar general developmental rate and course as the N-children. Therefore, we are interested in age effects in both populations with respect to grammaticality.

To answer these questions we will describe the definitions and operationalisation of the specific variables and the results with respect to the production of (un)grammatical T-units caused by grammatical errors in interviews with PI-children in comparison to N-children.

After transcription and segmentation of the conversational genre in communicative contributions (i.e. 50 T-units, elliptical answers, yes/no-answers and breaks) (see also 10.3), a grammatical judgement is made with regard to the 50 T-units expressed by the child. According to STAP (Van den Dungen and Verbeek, 1994, 1999), we counted the total number of ungrammatical utterances out of 50 T-units and the total number of grammatical errors in 50 T-units. A T-unit is defined as ungrammatical when the T-unit is incorrect from morphological or syntactic perspective related to standard conversational Dutch. It concerns a judgement of the form of language defined as follows (Van den Dungen and Verbeek, 1994:25, 1999):

(1) "A morphological error is an error in the inflection or conjugation of a verb, a noun or an adjective. It concerns a clear morphological error or an inflected or conjugated form which is not appropriate in the context".
(2) "A syntactic error is an error in the structure of the T-unit. A syntactic error arises from deletion, insertion, grammatical substitution, inversion or a combination of the above".

Examples of possible grammatical (morphological and syntactic) errors are given in 1 to 4.

**Example 1**

**Pronoun error in Dutch (PI-child; age 4.5)**

**Kimberley:**

Moet je altijd slapen, als je donker is.

Must-you-always-sleep-when-you-dark-is.

(You always have to go to sleep, when you is dark)

**Paraphrasis:**

[Dan] moet je altijd slapen, als <het> donker is.

[Then] must-you-always-sleep-when-it-dark-is.

(You always have to go to sleep, when it is dark)

**Example 2**

**Verb omission in Dutch (PI-child; age 4.7)**

**Pricilla:**

Die Ø beetje pot.

That Ø bit-broken.

(That Ø bit broken)

**Paraphrasis:**

Die [trui] <is> <een> beetje kapot.

That [sweater] is-a little-broken.

(That [sweater] is a little damaged)

**Example 3**

**Grammatical gender error in Dutch (PI-child; age 8.2)**

**Brenda:**

Maar die konijn is op wereldreis.

But that rabbit is making a trip around the world

**Paraphrasis:**

Maar <dat> konijn is op wereldreis.

But that rabbit is making a trip around the world

**Example 4**

**Word order error in Dutch (PI-child; age 7.5)**

**Pieter:**

Ze zal wel voor de kamer van het raam staan.

She will-in-front-of-the-room-of-the-window-stand.

(She will be standing in front of the room of the window)

**Paraphrasis:**

Ze zal wel voor <het raam> van <de kamer> staan.

She will-in-front-of-the-window-of-the-room-stand.

(She will be standing in front of the window of the room)

---

2 First, a Dutch example of a T-unit with a grammatical error or missing category is shown followed by a glossed version in English and then an English translation. Then the paraphrase line in Dutch is presented followed by a glossed version in English and the English translation. A grammatical form error is marked in Bold and a grammatical missing category is marked with the symbol [Ø] in Bold. The corrected form is presented between angle brackets < > in the paraphrase line. The conventions of transcription and segmentation symbols are shown in Appendix 4a.
When a morphological or syntactic error (omission, error in form and placement) is detected, the ungrammatical T-unit must be paraphrased into a grammatical one in the register of informal conversational Dutch. The type of morphological/syntactic error is classified into a specific morphological/syntactic category related to the noun, verb and adverb phrase to analyze the core problem of the ungrammaticality (see Appendix 3b variables according to STAP).

Grammaticality in general includes also the total number of grammatical errors as defined in this section. The ungrammaticality of a single T-unit can be based on a single grammatical error, but also on two or more grammatical errors, i.e. clustering of grammatical errors. Clustering of two grammatical errors is shown in Example 5.

Example 5  
Subject Verb agreement and grammatical gender error in Dutch (PI-child; age 5:9)

Kay: Wij maakt zo een soort trippeltje die zo naar beneden ken.  
(We is making a kind of <lexical new form> that goes downwards)

Paraphrasis: Wij <maken> zo een soort <trippelije> <dat> zo naar beneden kan.  
(We are making a kind of <lexical new form> that goes downwards)

In Example 6, clustering of ten grammatical errors in a single T-unit is shown.

Example 6  
Clustering of ten grammatical errors in Dutch (PI-child; age 4:2)

Gary: +" Pions, helemaal onder water met eh bodem gegooid, helemaal andere water.  
(Splash, entirely under water thrown with eh bottom, entirely other water)

Paraphrasis: <Toen> <heb> <ik> <de kikker> helemaal <in> <dat> onder water geegooid, helemaal <in> <dat> andere water.  
(Then I threw the frog right down to the bottom under water, entirely in that other water)

In order to identify children with problems in morphosyntax, we analysed the grammaticality in general, including ungrammatical T-units, total grammatical errors and clustering of grammatical errors. A frequent use of ungrammatical T-units and grammatical errors indicate a slight or severe morphological/syntactic disorder. According to the STAP guidelines children who are more than 2 standard deviations (sd) below the norm on either variable are interpreted as having severe problems. Children whose scores are between -2sd and -1sd are categorized as having slight problems. In a normal population 2.5% can be expected to score below 2sd and 16% below 1sd. If the children are different as a group, these percentages should be higher. On these variables the PI-children are compared with the N-children from the STAP population. Differences are tested using a Binomial test (see 3.6).
4.2.2 Results: Ungrammatical T-units and Grammatical Errors

Table 4.2 shows the distribution of the total number of PI-children per age group and the total number of PI-children according to the production of the number of ungrammatical T-units and grammatical errors per interview. The production of ungrammatical T-units and grammatical errors expressed by 120 PI-children are compared to the production of 240 N-children from the STAP-population.

Table 4.2 Distribution of total number and percentage of 20 PI-children per age group and total number and percentage of 120 PI-children categorized according to z-scores sd $\leq -2$, $-2 < sd \leq -1$ and $sd > -1$ on the variables total number of ungrammatical T-units and total number of grammatical errors in the conversational genre

<table>
<thead>
<tr>
<th>PI-children n=120</th>
<th>Ungrammatical T-units</th>
<th>Grammatical errors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>sd $\leq -2$</td>
<td>-2 &lt; sd $\leq -1$</td>
</tr>
<tr>
<td>z-scores Normal distribution</td>
<td>2.3%</td>
<td>16%</td>
</tr>
<tr>
<td>4 yrs</td>
<td>11</td>
<td>55%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>7</td>
<td>35%</td>
</tr>
<tr>
<td>6 yrs</td>
<td>9</td>
<td>45%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>12</td>
<td>60%</td>
</tr>
<tr>
<td>8 yrs</td>
<td>13</td>
<td>65%</td>
</tr>
<tr>
<td>9 yrs</td>
<td>9</td>
<td>45%</td>
</tr>
<tr>
<td>Total children /%</td>
<td>61</td>
<td>51%</td>
</tr>
</tbody>
</table>

First, when we compare the number of ungrammatical T-units produced, a significantly high number of PI-children represent the two marked categories (second and third column). Instead of the expected 2.3% (based on the results in the STAP-population) half (51%) of the PI-children show severe problems with grammaticality ($p<.000$). Additionally, a third (31%) of the PI-children shows slight grammatical problems ($p<.000$) instead of the expected 16%. These results indicate that 82% of the PI-children have a severe or slight morphological/syntactic disorder. These PI-children with a severe or slight morphological/syntactic disorder ($z \leq -1$) are distributed over the four specific psychiatric disorders as follows (see 3.2.1): 32 (out of 41: 78%) PI-children with internalizing disorders, 31 (out of 32: 97%) PI-children with externalizing disorders, 22 (out of 25: 88%) PI-children with PDD-NOS and 13 (out of 22: 59%) PI-children with 'No Diagnosis' (see also 3.2). These results indicate that particularly PI-children with externalizing symptoms, that is Oppositional Behavioural Disorder and ADHD, and PI-children with a combination of internalizing and externalizing symptoms, that is PDD-NOS, produce too many ungrammatical utterances.
Only 18% of all 120 PI-children showed no problems at all in morphology/syntax. These children are more or less equally divided over the age groups. At least 10% of the PI-children in each age group have no problems. In two age-groups this percentage is considerably higher, namely 25% in the five-year-olds and 30% in the six-year-olds.

Second, when we compare the total number of grammatical errors that are produced in an interview (see Table 4.2), again a significantly high number of children is found in the two marked categories: 73% of the PI-children have severe problems (p<.000) and 18% have slight problems with morphosyntax (p<.000). Thus, 91% of the PI-children have a severe or slight morphological/syntactic disorder on this variable, whereas only 9% of the PI-children show a 'normal' percentage of grammatical errors. These children are almost equally divided over the age groups (0% to 10%) with the exception of 15% found in the eight-year-old age group. Thus, PI-children produce more ungrammatical T-units compared to N-children of the same age. Almost each age group in the PI-children produces twice as many ungrammatical T-units as expected in the STAP-norms (see Appendix 4b). On average a third of the utterances in the interview is grammatically marked. In both populations the mean percentage of ungrammatical T-units decreases, as is shown in Figure 4.1.

Figure 4.1 Development with age of mean percentage of ungrammatical T-units (related to 50 T-units) in 240 N-children (STAP, 1994) and 120 PI-children in the conversational genre

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3 Unfortunately, STAP (Van den Dungen and Verbeek, 1994, 1999) only provides z-scores on behalf of the total population, so no individual scores are available. The mean total number of ungrammatical T-units are the values found at the z-score of zero. STAP only uses age groups of four, five, six, seven till eight-year-old. Therefore, the number of ungrammatical T-units in eight and nine-year-olds are assessed by extrapolation and are similar to the number in the seven-year-olds.

4 The mean value of the eight and nine-year-old N-children is assessed by extrapolation.
It is evident from this figure that the PI-children are slower in their development of grammaticality. The N-children show a minimal decrease with age, but because of the non-availability of individual scores of all the N-children, we cannot investigate whether the development within these children is substantial and linear. Within the PI-children there is an extremely significant age effect5 (F(5,114)=5.394; p<.000), i.e. there was an expected decrease of ungrammatical T-units with age. This can almost be fully described as a linear trend (F(1,114)=17.268; p<.000; Eta squared .196; R squared .127).

With respect to the variable grammatical errors we find comparable results to these for the variable ungrammatical T-units. Appendix 4c presents how many grammatical errors (out of 50 T-units) per age group are found in the N and PI-children. The PI-children make far more errors than the N-children: N-children have only a third of the number of grammatical errors compared to PI-children. Figure 4.2 shows both developments with age in producing grammatical errors8 (see also Appendix 4c). Both populations show a decrease of the total number of grammatical errors with age. Again, the PI-children show a slower development with respect to the production of errors than the N-children. Possibly the shape of the development curve in PI-children is comparable to earlier stages in the N-children, but the nine-year-old PI-children still have not reached the level of four-year-old N-children. Since individual scores of all N-children are unavailable, we cannot investigate whether the development within these children is substantial and linear. Within the PI-children an extremely significant age effect9 (F(5,114)=5.65; p<.000) was found, largely explained by a linear decrease (F(1,114)=20.490; p<.000; Eta squared .20; R squared .14).

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5 The data of the PI-children were submitted to a one-way Analysis of Variance (ANOVA) in a between-subjects design with Ungrammatical T-units as dependent variable and age as independent variable for all age-groups (4-5-6-7-8-9 yrs) (Van den Brink and Koole, 1986). The one-way ANOVA is executed with the specifications Polynomial and Contrast to find possible linear age effects within one population. Only significant results are reported in the text.

6 In order to quantify the extent of the differences the Eta squared value is used: Eta squared value more than 20% indicates a 'substantial' difference; Eta squared value between 20% and 10% indicates 'moderate' difference; Eta squared value below 10% indicates 'relative small' difference. In order to gain insight in the linearity of the relation between age and a dependent variable the R squared values are reported as percentage variance explained, as for example the relation under investigation between age and the total number of ungrammatical T-units. If the R squared value and Eta squared value approach each other, the variance explained can be almost fully described as a linear trend. If the R squared value is at least 80% of the Eta squared value, the variance explained can be largely described as a linear relation. If the R squared value is at least 60% of the Eta squared value, the variance explained can be partly described as a linear relation.

7 The differences found can be classified as 'moderate' differences and the percentage variance explained is judged as 'large'.

8 The mean value of the eight and nine-year-old N-children from the STAP-population is assessed by extrapolation.

9 ANOVA with grammatical errors as dependent variable and age (4-5-6-7-8-9yrs) as independent variable is used in the PI-children. These differences can be classified as 'substantial' differences and the percentage variance explained is judged as 'large'.
4.2.3 Conclusion: Ungrammatical T-units and Grammatical Errors

The developmental literature described in section 1.1.1 reported relatively few PI-children with morphological/syntactic problems. We found that many PI-children produce too many ungrammatical T-units and grammatical errors in all age groups compared to the N-children from the STAP-population. It is even more remarkable that the PI-children do not catch up in the period under investigation: the grammatical difficulties are still persistently present in some older PI-children.

It is evident from the results that morphological/syntactic problems are not exclusively related to one type of PI, since we found that grammaticality problems were distributed over all the four specific PI's. However, particularly PI-children with externalizing disorders (Oppositional Behavioural Disorder and ADHD (APA, 2000)) and with the internalizing/externalizing disorder PDD-NOS (APA, 2000) tend to have grammaticality problems: nearly all children in both disorders showed slight to severe morphological/syntactic problems.

4.3 Clustering of Grammatical Errors

4.3.1 Research questions, definitions and operationalisations

An ungrammatical T-unit always indicates at least one grammatical error, but there can be more errors within the T-unit. Clustering of grammatical errors is not visible in the number of ungrammatical T-units, so the variable grammatical errors is necessary as counterpart to show the density of ungrammaticality in the conversation. Clustering of grammatical errors influences the information exchange between the child and the adult negatively, since error-clusters seems to be highly related to unintelligibility of the target message.

The extremely high number of grammatical errors in PI-children makes it worthwhile to analyze the clustering of grammatical errors: the occurrence of two or more errors within a T-unit, i.e. error clustering versus non-error clustering: the occurrence of single errors within a T-unit. Therefore, we have to answer the following questions: is the number of clustering of errors in interviews with PI-
children comparable to the average amount in interviews with N-children? And, is there comparable development with age?

In order to answer this question, we calculated the percentage \(T\)-units with a single error out of 50 \(T\)-units as opposed to the percentage \(T\)-units with two or more errors out of 50 \(T\)-units. The two variables with respect to grammaticality, i.e. total number of ungrammatical \(T\)-units and of grammatical errors (STAP; Van den Dungen and Verbeek, 1994, 1999), are thus more or less mutually dependent.

Since this type of analysis has not been carried out on PI-children nor on Dutch-speaking N-children, we had no expectations about possible group or age effects. Thus, Dutch norms related to clustering of grammatical errors were not available unlike the many other norms for other morphological/syntactic variables based on the 240 N-children from the STAP-population. We therefore had to compare the PI-children with the N-children from the Roelofs-population\(^{10}\) (1998).

As Roelofs (1998) predominantly focused on pragmatic development in normally developing children, we had to carry out the morphological/syntactic analyses of N-children\(^{11}\) ourselves in order to have a comparison group. For reasons of time, we had to make a selection of the N-children from the Roelofs-population. Therefore, not all age groups of the 75 N-children were included, but only the four, six and eight year olds (n=45). This age range, including the youngest and oldest N-children, was selected in order to cover all age groups in morphological/syntactic development.

To determine whether the Roelofs-population represents a population with 'normal grammatical behaviour', we compared the ability to produce grammatical \(T\)-units of these 45 N-children from the Roelofs-population with the production of 180 same-aged N-children from the STAP-population, using a Binomial test. First, with respect to the grammaticality of the \(T\)-units, the results indicate that a large subgroup (73%) of the Roelofs-population shows 'normal grammatical behaviour', but that the number of N-children with grammatical problems was higher than would be expected (see Appendix 4d). In a normally distributed population of 45 N-children, it can be expected that one child (2.3%) might show a severe problem in the production of ungrammatical \(T\)-units, but in fact four out of 45 N-children had such a problem. In a normally distributed population of 45 N-children, it can be expected that seven children (16%) might show slight problems with the production of ungrammatical \(T\)-units, but in fact eight out of 45 N-children had such a problem.

Second, with respect to the grammatical errors, 60% of the 45 N-children from the Roelofs-population had a normal amount of grammatical errors in their \(T\)-units (see Appendix 4d). Here, eight children instead of the expected one child were found to

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10 This was not only the case with respect to the analyses of clustering of grammatical errors, but also with respect to the analyses of the use of lexical verbs with their arguments, of tense marking, of the use of prepositions and conjunctions that were not studied in the STAP research project (Van den Dungen and Verbeek, 1994, 1999) (see for results Chapters 5 to 8).

11 A preliminary analysis of the verb and its argument structure in the N-children of the Roelofs-population (Roelofs, 1998) was carried out by students (Baker, De Geus, Van Amstel, Gosselaar, Schurij, Ursem, Verkoeijen and De Wijckerslooth, 1998), whereas the final analysis has been carried out by Annette Schepers.
have a severe problem and ten instead of the expected seven children showed slight problems.

Furthermore, the development with age in the Roelofs-population shows 'normal grammatical growth', when compared to the same-aged N-children from the STAP-population: there is a linear decrease with age of the mean total number of ungrammatical T-units and grammatical errors observed in the Roelofs-population (see Appendix 4e). These results show that the four-year-olds in the Roelofs-population produce significantly more ungrammatical T-units and grammatical errors than the older ones and confirm a development in grammatical skills with age comparable to the STAP-population.

Although the Roelofs-population does not represent a population with the most ideal 'normal grammatical behaviour' on all levels, we might nevertheless conclude that, if the PI-children are significantly worse than these N-children from the Roelofs-population, we can be sure that the PI-children genuinely have morphological/syntactic problems. In sum, we think that for the analyses of clustering of grammatical errors it is acceptable to use the N-children from the Roelofs-population (1998) as a comparison group.

### 4.3.2 Results: Clustering of Grammatical Errors

In Table 4.3 it is shown how many T-units with a single error as opposed to T-units with two or more grammatical errors the N and PI-children produce in the age groups of four, six and eight years.

Firstly, we compare the production of T-units with a single error. From Table 4.3 it is clear that the 60 PI-children produce significantly more T-units with one grammatical error than the 45 N-children; this proved to be a significant group effect (F(1,99)=4.061; p<.047). An age effect was also observed with respect to the variable under investigation\(^{12}\) (F(2,99)=3.595; p<.031). As expected the 45 N-children show a significant linear decrease with age in using T-units with a single error\(^{13}\) (F(1,42)=9.532; p<.004; Eta squared = .19; R squared = .19). Surprisingly, the 60 PI-children do not show a significant linear decrease in the production of T-units with a single error. However, a delayed start of this development in the PI-children might be there, as a decrease in the production of one-error T-units is only observed between six and eight years and not from age four on, contrary to this development observed in the N-children.

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12 ANOVA with T-units with a single grammatical error related to total number of 50 T-units as dependent variable and age (4-6-8yrs) as independent variable shows a significant group and age effect in the N- and PI-children. No significant group*age interaction effect was found.

13 If a main effect for age or a group*age interaction effect is found, post hoc trend analyses using one-way ANOVA were executed to examine the linearity of the age effects in both N and P-children. One-way ANOVA with T-units with a single grammatical error related to total number of 50 T-units as dependent variable and age (4-6-8yrs) as independent variable in the N-children is used.
The ability to produce grammatical utterances: grammaticality in general

Table 4.3 Mean total number, percentage (related to 50 T-units) and standard deviations T-units with one grammatical error and T-units with two or more grammatical errors (i.e. clustering of errors) in 45 N-children (Roelofs, 1998) and 60 PI-children in the conversational genre

<table>
<thead>
<tr>
<th>Mean total T-units with:</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=45</td>
<td>n=60</td>
</tr>
<tr>
<td>Single grammatical error</td>
<td>x  %  sd</td>
<td>x  %  sd</td>
</tr>
<tr>
<td>4 yrs</td>
<td>8.41 17% 3.70</td>
<td>8.40 17% 4.25</td>
</tr>
<tr>
<td>6 yrs</td>
<td>6.80 14% 1.86</td>
<td>8.40 17% 3.93</td>
</tr>
<tr>
<td>8 yrs</td>
<td>5.00 10% 3.18</td>
<td>7.45 15% 2.56</td>
</tr>
<tr>
<td>Total mean</td>
<td>6.73 13% 3.26</td>
<td>8.08 16% 3.62</td>
</tr>
<tr>
<td>Clustering of two or more grammatical errors</td>
<td>x  %  sd</td>
<td>x  %  sd</td>
</tr>
<tr>
<td>4 yrs</td>
<td>5.46 11% 3.11</td>
<td>13.50 27% 9.05</td>
</tr>
<tr>
<td>6 yrs</td>
<td>3.13 6% 1.85</td>
<td>9.85 20% 5.83</td>
</tr>
<tr>
<td>8 yrs</td>
<td>3.67 7% 2.90</td>
<td>8.65 17% 4.04</td>
</tr>
<tr>
<td>Total mean</td>
<td>4.09 8% 2.80</td>
<td>10.67 21% 6.85</td>
</tr>
</tbody>
</table>

Secondly, in Table 4.3, it also shown that the frequency of T-units with clustering of two or more grammatical errors found in the production of the PI-children is higher than in the production of the N-children. This proved to be a highly significant group effect (F(1,99)=39.157; p<.000). Just as no age effect was observed for the production of one-error T-units, also no significant age effect is found for the production of more-than-one-error T-units in both populations (F(2,99)=4.046; p<.020), although the N-children show an expected decrease with age in error-clustering that is almost significant (F(2,42)=3.131; p<.054). This cannot be explained as a linear development. The PI-children show again no significant decrease with age of clustering of errors. Figure 4.3 illustrates the distribution of the clustering of errors in both populations.

14 ANOVA with T-units with clustering of two or more grammatical errors related to total number of 50 T-units as dependent variable and age (4-6-8yrs) as independent variable in the N- and PI-children. No significant group*age interaction effect was found. Notice the high standard deviation found in the four-year-old PI-children, which indicates a great individual variation within this age group related to the production of two or more grammatical errors within one T-unit.

15 One-way ANOVA with T-units with clustering of two or more grammatical errors related to total number of 50 T-units as dependent variable and age (4-6-8yrs) as independent variable in the N-children.
Notably, the frequency of clustering in the eight-year-old PI-children is even higher than the frequency of clustering found in the four-year-old N-children, because of the extremely high number of grammatical errors found in PI-children. In order to gain insight into whether PI-children with a specific PI showed particular problems with error-clustering, we calculated z-scores for 60 PI-children based on all N-children (Roelofs-population): the cut-off point for severe error-clustering problems ($z \leq -2$) was set at 10. This means that PI-children who used 10 or more T-units with clustering of two or more errors in the interview were defined as deviant; the cut-off point for slight error-clustering problems ($-2 < z \leq -1$) was set at 7. If we take the severe and slight problems together ($z \leq -1$), 43 (72%) PI-children showed clustering that occurs most frequently in PI-children with externalizing disorders (n=14; 33%), followed by PI-children with PDD-NOS (n=11; 26%) and then followed by PI-children with internalizing disorders and 'No Diagnosis' (both n=9; 21%).

4.3.3 Conclusion: Clustering of Grammatical Errors
We conclude that the 60 PI-children at four, six and eight year show significantly more clustering of two or more errors within a T-unit than the 45 same-aged N-children. In N-children single grammatical errors occur more frequently than clustering, whereas in PI-children clustering occurs more frequently than single errors (see Chapter 5 to 8 for detailed error-analyses). What is more, clustering of errors produced by PI-children could sometimes consist of seven to ten grammatical errors (see Example 6 in 4.3), whereas in N-children such a high number of errors within a single T-unit never occurs.

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16 We derived z-scores based on the mean scores of 45 N-children from the Roelofs-population (1998). Since the N-children showed a total mean of 4.09 error-clustered T-units and a standard deviation of 2.80 (see Table 4.3), the cut-off point for severe error-clustering problems ($z \leq -2$) was set on 10 and for slight problems ($-2 < z \leq -1$) on 7.
Although error-clustering is found in all four types of PI-children (see 3.2), the subgroups of externalizing disorders and PDD-NOS have the highest number of children who are deviant in this aspect. Remarkably, the highest number of error-clustered T-units is observed in some PI-children with PDD-NOS: sometimes 40% to 50% of their T-units showed clusters of errors. It is evident that clustering of errors at T-unit level negatively influences the intelligibility of the information exchange about daily-life topics in the interview.

4.4 General conclusions: the ability to produce grammatical utterances

It is clear that morphology/syntax in terms of grammatical form in general is affected in the 120 children with a psychiatric disorder in the conversational conversational genre. 82% of all PI-children as a group produce too many ungrammatical T-units compared to the 240 N-children of the STAP-population, as we take the total number of ungrammatical T-units as criterion for the degree of ungrammaticality. Taking the total number of grammatical errors as criterion, even 91% of all PI-children showed too many grammatical errors compared to the N-children at all ages studied (see Table 4.4).

<table>
<thead>
<tr>
<th>Grammatical form in general</th>
<th>N-children n=240/n=45</th>
<th>PI-children n=120/n=60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too many Ungrammatical T-units</td>
<td>2.3%</td>
<td>82%</td>
</tr>
<tr>
<td>Too many Grammatical errors</td>
<td>2.3%</td>
<td>91%</td>
</tr>
<tr>
<td>Clustering of errors:Too many single T-units with two or more errors</td>
<td>8%</td>
<td>21%</td>
</tr>
</tbody>
</table>

Consequently, only 18% of the PI-children show 'normal' grammatical abilities with respect to the production of ungrammatical T-units and only 9% with respect to the production of grammatical errors. Although younger PI-children show significantly more problems with ungrammaticality than older ones, it is highly remarkable that the oldest PI-children still not reach the grammatical level of the youngest N-children, but even produce more errors and ungrammatical T-units. Moreover, the difficulties in producing correct morphological/syntactic utterances are observed in all four specific psychiatric disorders (see 3.2.1). Almost all PI-children with externalizing PI and PDD-NOS produce too many ungrammatical utterances.

What is more, taking cluster analysis of grammatical errors as an additional measure of grammaticality, striking evidence is found for the existence of morphological/syntactic impairment in PI-children. It seems that in PI-children often more than one
morphological/syntactic category within a single utterance is involved in creating ungrammaticality. Clustering of seven to ten grammatical errors is not an exception in these children, whereas the N-children never produce this large number of errors within one single utterance. The phenomenon of error-clustering is found in all four specific psychiatric disorders, although the largest proportion of children is found in the subgroup with externalizing disorders and PDD-NOS. The latter also produced the highest number of error-clustered T-units in their interviews compared to the other three PI-groups with specific PI. These results confirm the findings of Stevenson et al., (1985): we also find significantly more morphological/syntactic problems in a large subgroup of PI-children with internalizing and/or externalizing disorders, but most obviously in PI-children with externalizing symptomatology. Since every aspect of ungrammaticality influences the comprehension of the message in the conversational genre, the high level of ungrammaticality found in PI-children influences the information exchange about daily-life events between the child and the adult in an extremely negative way, resulting in communicative breakdowns.

The following chapters present the results of the (un)grammaticality of specific lexical and functional categories in the 120 PI-children. In this way, we can define more precisely the morphological/syntactic disabilities in PI-children in the conversational genre. As stated in 3.2.3, we use the Explanatory Criterion (Burisch, 1984) that uses significant difference of group effects to classify deviant behaviour from normal behaviour. On the basis of a detailed morphological/syntactic spontaneous language analysis we will explore whether clear differences can be found between the PI-children and the N-children.

The results presented in Chapters 5 to 7 are largely based on error analyses, whereas Chapter 8 mainly concerns analysis of complexity. More precisely, in Chapter 5 we analysed the effect of missing lexical categories and in Chapter 6 the effect of wrongly used lexical categories on grammaticality. Next, in Chapter 7 the analysis of errors in the realization of functional categories is the central issue, followed by Chapter 8 concerning the ability of syntactic packaging in the conversational genre. Finally, in Chapter 9 the performance related to grammaticality, temporality, transitivity of the verb, agreement relations and the ability of syntactic packaging are compared in two genres, the narrative and the conversational genre. Finally, we will try to provide a profile for the morphological/syntactic disorders that is typical for the 120 Dutch-speaking psychiatrically impaired children.
5 The ability to realize lexical categories: lexical verbs, verbal arguments, prepositions and adverbials

Annette Scheper

5.1 Introduction

As mentioned in Chapter 4, linguistics divides morphological/syntactic categories into lexical and functional categories. Lexical categories, like verbs, nouns, adjectives and prepositions are distinguished from functional categories, like inflection morphemes, auxiliaries, copula verbs and determiners. Lexical categories undergo functional adjustments that determine the syntactic structure. Children have to acquire lexical categories and a set of functional projections to construct the grammar of their specific language (e.g. Clahsen 1989; Chomsky, 1992). A large subgroup of SLI-children shows grammatical disorder in contrast to subgroups that have exclusively phonological or semantic-pragmatic disorders (Clahsen, 1989; Beers, 1995; Fletcher and Ingham, 1995; De Jong, 1999). Attention was first focussed on the problems with functional categories in English and German (Leonard, 1989; Clahsen, 1989, 1990; Gopnik, 1990; Grela and Leonard, 2000). Grammatical morphemes are frequently omitted in an obligatory context or substituted. Second, problems with verb argument structure have been identified in English (King and Fletcher, 1993) and Dutch SLI-children (De Jong, 1999). Argument drop appears to be a universal phenomenon in linguistic development and occurs in different languages (Haegeman, 1991), but in SLI-children omission of an argument results too often in ungrammaticality and continues for a long time. A pilotstudy in 18 Dutch-speaking PI-children showed similar problems in realizing lexical categories, i.e. realizing the verb and it's arguments compared to SLI-children, but no incorrect use of functional categories was observed (Mills and Tso, 1991). Like SLI-children, PI-children seem to have problems in identifying the obligatory syntactic categories to constitute a proper grammatical sentence. The goal of this section is to examine whether lexical categories constitute a problem for PI-children and thus contribute to the ungrammaticality found in Chapter 4. The different lexical categories involved are lexical verb (5.2), argument structure – specifically the subject (5.3) and the direct object (5.4) and the distribution of subjects and objects (5.5) – prepositions (5.6) and adverbials (5.7). To gain a better insight in the (un)grammatical form of the different lexical categories, we

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1 For an overview of linguistic explanations of grammatical SLI we refer to De Jong (1999:21).
2 A handbook for the analysis of lexical categories has been developed (Scheper, 1996).
distinguish two error types: missing lexical categories, where an obligatory element is omitted in the T-unit and errors in lexical categories, where an element that is present in the T-unit is used incorrectly. The type of ungrammaticality has a varying impact on the understanding of the message. The missing lexical categories are discussed in this chapter and the errors in lexical categories in Chapter 6. The results with respect to the missing lexical categories in 120 PI-children are compared to those in 45 N-children from the Roelofs-population aged four, six and eight years (Roelofs, 1998).

5.2 Missing Lexical Verbs

5.2.1 Research questions, definitions and operationalisations
With age children have to learn that the syntactic frame of a sentence consists of verbal and nominal elements. So each sentence needs a verbal part. Dutch verbs, much like in English, behave differently according to their semantic functionality. A distinction must be made between lexical verbs, modals, copula and auxiliaries. Not surprisingly, very young Dutch-speaking children start out by using simple verb phrases. On the surface they resemble adult verbs and they are initially limited to one single verb element per utterance (Gillis and De Houwer, 1998). By the time they are four years old, Dutch-speaking children already use a large number of verb phrases that are possible in adult Dutch. They also appropriately combine full lexical verbs with auxiliaries. At the age of four, children still largely limit themselves to two-term verb phrases, although three and four-term combinations are quite possible in adult Dutch.

From Chapter 4, it is clear that PI-children produce too many ungrammatical T-units. The children therefore seem to have problems with acquiring the rules of their grammar. Frequently unexpressed verbal elements indicate problems with the acquisition of the syntactic frame of a sentence. In order to gain insight whether missing lexical verbs play a substantial role in creating ungrammaticality the absence of lexical verbs is analysed. This section addresses the following research question: is the number of missing lexical verbs in interviews with PI-children comparable to the amount in interviews with N-children? And, is there a comparable development with age?

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3 Errors of omission are particularly problematic since it is possible that the child knows that they are not acceptable, but because of performance limitations, the child is unable to produce all of the constituents he knows that are required (Stromswold, 1996:33).

4 In the analysis of missing lexical categories N-children from the Roelofs-population (1998) are included, because the STAP (Van den Dungen and Verbeek, 1994, 1999) does not use all the missing categories as defined in this section.
The ability to realize lexical categories

The analysis of missing lexical verbs uses all omitted main verbs that assign thematic roles. Independent modal verbs are coded as main verbs. Copula verbs do not assign thematic roles and are therefore not included. If a main verb is left out in a T-unit, ungrammaticality as defined in 4.3 was considered. To determine the rate in which lexical verbs are missing, all 50 T-units minus the T-units with copula verbs are used. The outcome of a T-unit with a missing main verb is either a verbless T-unit (see Example 1) or a T-unit with an auxiliary in second position (see Example 2).

Example 1  Missing lexical verb of category 1 in Dutch resulting in a verbless T-unit (PI-child; age 4;11)

Interviewer:  Wat deed je toen?
(what did you do then?)
Rick:  Zo grote Ø tot op de grond.
Such-large-Ø down-to-the-ground.
(Such a large Ø down to the ground)
Paraphrasis:  Zo'n grote stok vond ik van hier tot op de grond.
(I found such a large one [stick] from here down to the ground)

Example 2  Missing lexical verb of category 1 in Dutch resulting in a T-unit with an auxiliary in second position (PI-child; age 4;11)

Rick:  En toen had ik Kinderen voor Kinderen Ø.
(And then I had Ø for Children for Children)
Paraphrasis:  En toen had ik Kinderen voor Kinderen geluisterd.
(And then I had listened to Children for Children)

Some T-units include direct voice, but the main predicate with a verb of saying is missing. According to Dutch traditional grammar such sentences are seen as dependent sentences with an unexpressed main clause (Haeseryn, Romijn, Geerts, De Rooij and Van den Toorn, 1997:1097). Although not all linguists share this 'view of dependency', T-units of this type are included in the analysis here, but only the literally expressed part of the T-unit is used for the analysis of the category missing lexical verb, whereas the 'unexpressed' main predicate is not included (see Example 3).

---

5 Ø means an unexpressed linguistic category.
6 Children for Children is a proper name, namely the name of a Dutch children's choir.
7 Several linguists claim that spontaneous language utterances with direct voice constructions have an autonomous character without an explicit main clause.
Example 3

Direct voice construction with a missing main clause in Dutch (PI-child; age 8;2)
(Conversational topic: according to the PI-child, the pet animal is scared about the
way in which he is lifted by the sister of the PI-child)

Tanja: "want daar wordt dat beestje bang van". 
"because-therefore-is-that-animal [+little]-scared-for".
(0 "because it scares that little animal")

Paraphrase:
"Ik zei "want daar wordt dat beestje bang van". 
"I said" "because-it-will scare that little animal")

Although the missing lexical verb 'zeggen' (to say) in the implicit main clause 'ik zei' 
(I said) in Example 3 is not realized, this 'omitted' main clause was not included in 
the decision about grammaticality.

5.2.2 Results: Missing Lexical Verbs

Table 5.1 shows that PI-children clearly have significantly more missing lexical verbs
than N-children in all age groups (F(1,98)=22.048; p<.000). It was expected that
children in general will express more lexical verbs with age, because the lexical
development with regard to verbs is not finished at the age of four. Surprisingly,
however, no clear development with age was observed in either N- or PI-children.

<table>
<thead>
<tr>
<th>Missing lexical verbs</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td>x % sd</td>
<td>x % sd</td>
<td></td>
</tr>
<tr>
<td>T-units used in analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total mean 41.53 - 3.17</td>
<td>39.98 - 4.28</td>
<td></td>
</tr>
<tr>
<td>4 yrs 1.60 4% 1.59</td>
<td>5.60 13% 6.02</td>
<td></td>
</tr>
<tr>
<td>5 yrs - - -</td>
<td>2.90 7% 2.17</td>
<td></td>
</tr>
<tr>
<td>6 yrs 0.73 2% 1.10</td>
<td>3.90 10% 2.67</td>
<td></td>
</tr>
<tr>
<td>7 yrs - - -</td>
<td>1.65 4% 1.50</td>
<td></td>
</tr>
<tr>
<td>8 yrs 1.73 4% 1.49</td>
<td>2.10 5% 1.55</td>
<td></td>
</tr>
<tr>
<td>9 yrs - - -</td>
<td>2.50 6% 2.21</td>
<td></td>
</tr>
<tr>
<td>Total mean 1.35 3% 1.45</td>
<td>3.11 8% 2.69</td>
<td></td>
</tr>
</tbody>
</table>

8 ANCOVA with T-units without a lexical verb as dependent variable, 50 T-units minus copula verbs
as covariate and group (N-PI) and age (4-6-8yrs) as independent variables; no significant age and
group*age interaction effects were found. The total number of copula verbs varies significantly per
child (F(1,98)=7.148; p<.009), so therefore the covariate '50 T-units minus copula verbs' is used to
reduce the possibility that the different number of copula verbs influences the results with respect to
the comparison of the T-units without a lexical verb in both populations.
As is shown in more detail in Figure 5.1, the youngest PI-children have the most missing lexical verbs.

**Figure 5.1** Development with age of percentage missing lexical verbs (related to 50 T-units minus copula verbs) 45 N-children and 120 PI-children

Although the frequency decreases with more than 50% in the oldest PI-children, no significant development with age is found.

**5.2.3 Conclusion: Missing Lexical Verbs**

PI-children show significantly more missing lexical verbs in comparison to their age-matched peers. The main predicate of the T-unit is often missing or incomplete, causing an ungrammatical T-unit. These results provide strong support for problems with the syntactic frame of a sentence in the PI-children. They have difficulties in selecting the correct syntactic information necessary to describe an event. The missing verb forms indicate that a subgroup of PI-children gives static descriptions of events in real life, instead of relating successive or simultaneous events into coherent discourse (see 9.3 and 12.4 to 12.8).

**5.3 Missing Subjects**

**5.3.1 Research questions, definitions and operationalisations**

When learning to produce verbs, children also have to learn which obligatory arguments, a subject, object or other type of argument, a verb requires (e.g. Chomsky, 1981; Pinker, 1984). A sentence is considered to be grammatical only if the arguments specified as obligatory by the verb's argument structure are actually present as constituents in the sentence (Chomsky, 1981). The information as to the semantic relationship between the predicate and its arguments is part of the lexical knowledge of the native speaker and should also be recorded in the lexicon. The types of arguments that a verb takes are specified by the semantic functions of the arguments: Agent, Goal, Recipient, etc. (e.g. Haegeman, 1991). There is agreement that subjects and objects are equal to some extent: they are arguments of the verb
The most obvious difference between them is obligatoriness. Subjects are obligatory in each sentence of every language, whether these subjects are phonetically empty or not (Chomsky, 1981). Chomsky specified this requirement in his Extended Projection Principle. Languages with phonetically non realized subjects, like Italian and Spanish, are called 'null-subject languages'. Dutch is not a null-subject language, so every Dutch sentence principally requires an overt subject. Since Dutch is also a topic drop language (Jansen, 1981; Weerman, 1989), only certain pragmatic conditions can motivate a missing subject and object in Dutch, which will not lead to ungrammaticality. The phenomenon of dropping arguments, a subject or an object, in topic position is called discourse topic drop and functions as a discourse-organising strategy to establish cohesion and coherency in normal spoken Dutch (De Haan and Tuijnman, 1988). The expectation on the basis of developmental research is that normally developing children have to learn the specific conditions that allow the use of missing subjects as cases of discourse topic drop. This is an indicator of good language capacities. But also a decrease in the number of missing subjects in general, which causes ungrammaticality, is expected (see also Thrift, 2003).

Dutch SLI-children omit more obligatory arguments of the verb and use more verbs without a complement than normal children (De Jong, 1999). A pilot-study with 18 PI-children showed that they also more frequently omit nouns in subject, object or prepositional relations than their age-peers (Ran and Smits, 1990). Because PI-children seem to have problems with selecting arguments with the verb, the central question is whether PI-children have more problems in realizing obligatory subjects, resulting in ungrammaticality as reported in Chapter 4. It is possible that PI-children use the strategy of discourse topic drop less than the N-children, if the PI-children have problems with grammatical and pragmatic rules, particularly in establishing coreferential cohesion (see 13.5 to 13.7). Therefore, we have defined two variables:

1. if missing subjects are a result of discourse topic drop (i.e. first position in the sentence and the referent is clear), they are called grammatical missing subjects, since they do not contribute to ungrammaticality.

2. if missing subjects are not a result of discourse topic drop (i.e. first position in the sentence, but the referent is not clear), they are called ungrammatical missing subjects. They contribute to ungrammaticality and indicate a delay in the acquisition of grammatical rules.

We will show whether the PI-children show less complex morphological/syntactic abilities than the N-children and whether they make more morphological/syntactic errors than N-children. The number of discourse topic drop will be clear from the number of ungrammatical missing subjects. We want to answer the following question: is the mean total number of grammatical and ungrammatical missing subjects in interviews with PI-children comparable to the average amount in interviews with N-children? And, is there a comparable development with age?
The ability to realize lexical categories

In order to analyze missing subjects, an NP was judged as subject based on context and word order. Although Dutch has a relatively free word order, the subject is mostly in first position, predominantly assigned with an external theta role for agent (e.g. Haegeman, 1991). When topicalization of some other element has taken place, putting that element in first position, the subject is placed after the finite verb. The analysis of missing subjects uses all T-units (out of 50) with a finite verb to determine the rate in which subjects are missing (Example 4). Example 4 shows a T-unit with an unspecified subject position (i.e. missing subject), whereas the particle verb 'opruimen' (to clean) assigns the semantic role of 'agent'.

Example 4 Missing subject in Dutch (PI-child; age 4.2)

Gary: En Ø ruim het graks toch weer op.
AndØ-clean-this-later-again-up.
(AndØ clean it up later)
Paraphrasis: En <i>ruim</i> het graks toch weer op.
And<i>-clean</i>-this-later-again-up.
(And <i>clean it up later</i>)

A missing subject is only licensed under two conditions. The first condition requires that the argument to be dropped is in the topicalized position, i.e. initial position in the sentence. Topicalization is only possible if a preposed finite verb is present. In this analysis we call this the place condition. The second condition concerns the correct referential relation of the dropped argument. The referent of the dropped argument must be recoverable from the preceding utterance. In the analysis under investigation we call this the reference condition. Only when these two conditions are fulfilled, can we code a grammatical missing subject; when these conditions are not fulfilled, we code an ungrammatical missing subject (Figure 5.2).

9 Wh-questions where the interrogative pronoun is the subject are included, whereas imperatives do not take subjects and therefore were excluded from this analysis. Passive constructions are excluded, because of the empty subject position, since passive verbs do not assign an external theta role for agent (Haegeman, 1991). These constructions were almost absent in the data.
We are only interested in the cases of missing subjects (marked Bold in Figure 5.2), so type 1 is not relevant here. Type 2 is a missing subject in topic position (place condition), which is referentially (reference condition) clear and the result is a grammatical missing subject (i.e. discourse topic drop). Only missing subjects as in type 2 establish appropriate coherence and cohesion in the interview and illustrate good language skills (see for more details 12.4 to 12.7 and 13.5 to 13.7). Types 3 and 4 always result in ungrammaticality. Missing subjects in topic position but referentially unclear (type 3) are judged as ungrammatical, because they do fulfil the place condition, but not the reference condition. Finally, missing subjects in non-topic position (type 4) are always judged as ungrammatical, because even the place condition is not fulfilled. The analysis of missing subjects includes the grammatical forms (type 2) and the ungrammatical forms (types 3 and 4).

10 The STAP-instrument (Van den Dungen and Verbeek, 1994:24, 1999) judges all missing subjects in initial position as ungrammatical without verifying the referential relation. A more differentiated approach with respect to the reference condition is necessary to judge whether a missing subject in initial position is grammatical or not (De Haan and Tuijnman, 1988).
First, an illustration of a grammatical missing subject in first position and referentially appropriate (type 2) is given in Example 5.

**Example 5**  
**Discourse topic drop of a subject in Dutch (PI-child; age 8;3)**

**Jeffrey:**  
Hij [Jeffrey's broer] is bijna achttien.  
He [Jeffrey's brother]-is-almost-eighteen.  
(He is almost eighteen)

**Jeffrey:**  
Ø ligt nog te duimen.  
Ø-is-still-sucking-his-thumb.  
(Ø is still sucking his thumb)

**Paraphrasis:**  
<Hij> ligt nog te duimen.  
<He>-is-still-sucking-his-thumb.  
(He is still sucking his thumb).

Example 5 fulfills the two conditions to establish discourse topic drop. There is an initial missing subject marked by a preposed finite verb and the missing element refers to the last mentioned animate referent, namely 'hij' (he). Example 6 illustrates an ungrammatical missing subject, which is in first position, but referentially inappropriate (type 3).

**Example 6**  
**Topicalized missing subject but referentially inappropriate in Dutch (PI-child; age 4;10)**

**Rudy:**  
Ik weet niet, waar ze woont.  
I-know-not,-where-she-lives.  
(I do not know where she lives).

**Adult:**  
Oh, en komt ze wel eens bij jou spelen?  
Oh,-and-sometimes-does-she-sometimes-come-to-play-at-your-house?)

**Rudy:**  
Ø weet ook niet, waar ik woon.  
Ø-know-neither-where-I-live.  
(Ø doesn't know either where I live).

**Paraphrasis:**  
<I(She)> weet ook niet, waar ik woon.  
<She>-knows-nor-where-I-live.  
(I/She) doesn't know either where I live).

In Example 6, it is not clear, whether the subject should be the pronoun 'ik' (I) or 'zij' (she), so the missing subject causes ungrammaticality and is not a case of discourse topic drop. Finally, Example 7 shows a missing subject in non-topic or post-verbal position, which always leads to ungrammaticality (type 4).

**Example 7**  
**Missing subject in non-topic or post-verbal position in Dutch (PI-child; age 7;4)**

**Robert:**  
Toen ging Ø deschonen.  
Then-went-Ø-to clean [with phonological error].  
(Then Ø started to clean)

**Paraphrasis:**  
Toen ging <mijn moeder> [de vissekom] verschonen.  
Then-went<my mother>-[the fishing bowl]-to clean.  
(Then my mother started to clean [the fishing bowl]).
5.3.2 Results: Missing Subjects

Overall, the PI-children have significantly more missing subjects than the N-children, irrespective of grammaticality, resulting in a significant group effect \( F(1,98)=6.989; p<.010 \)\(^{11}\) (see Appendix 5a).

We established the number of missing subjects in topic position, i.e. that fulfilled the place condition (Appendix 5b). Across the board N-children leave the preposed subject more frequently unexpressed than the PI-children, but no significant group and group*age interaction effects were found, only a significant age effect for both populations \( F(2,98)=3.385; p<.038 \)\(^{12}\). In N-children the significant age effect \( F(2,45)=4.337; p<.019 \)\(^{13}\) can be fully explained as a linear trend \( p<.023; \) Eta squared \(.14\); R squared \(.11\) and indicates a linear decrease between the youngest N-children and the oldest ones. However, in PI-children the significant age effect \( F(5,114)=3.490; p<.006 \)\(^{15}\) cannot be explained in terms of linearity. To sum up, the N-children show a linear decrease with age in leaving the subject in first position unexpressed in contrast to the PI-children.

Next, we selected missing subjects in topic position that are referentially clear: the grammatical missing subjects. We expect a higher number of grammatical missing subjects in the N-children compared to the PI-children and a higher number in the older children compared to the younger children (Table 5.2).

---

\(^{11}\) ANCOVA with T-units without a subject as dependent variable, all T-units with a finite verb as covariate and group (N-PI) and age (4-6-8yrs) as independent variables. No significant effect for age or a group*age interaction effect were found. A significant group*age interaction effect indicates that the change (decrease or increase) with age is different in the N-children compared to the PI-children.

\(^{12}\) ANCOVA with Topicalized missing subjects as dependent variable, total number of Missing subjects as covariate and group (N-PI) and age (4-6-8yrs) as independent variables.

\(^{13}\) The significant main effect for age motivates post hoc trend analysis using one-way ANOVA to examine the linearity of the age effect in both populations. One-way ANOVA with Topicalized missing subjects as dependent variable and age (4-6-8yrs) as independent variable in N-children.

\(^{14}\) For explanation of statistics see footnote 9 in section 5.2.

\(^{15}\) One-way ANOVA with Topicalized missing subjects as dependent variable and age (4-5-6-7-8-9yrs) as independent variable in PI-children.
The ability to realize lexical categories

Table 5.2  Mean total number, percentage (related to the topicalized missing subjects) and standard deviation grammatical missing subjects in 45 N-children and 120 PI-children

<table>
<thead>
<tr>
<th>Grammatical Missing Subjects</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x % sd</td>
<td>x % sd</td>
</tr>
<tr>
<td>Place and Reference condition fulfilled:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>0.53 35% 0.92</td>
<td>0.50 20% 0.69</td>
</tr>
<tr>
<td>5 yrs</td>
<td>- - -</td>
<td>0.40 57% 0.31</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.20 43% 0.56</td>
<td>0.60 38% 0.88</td>
</tr>
<tr>
<td>7 yrs</td>
<td>- - -</td>
<td>0.40 53% 0.99</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.20 33% 0.41</td>
<td>0.70 29% 0.86</td>
</tr>
<tr>
<td>9 yrs</td>
<td>- - -</td>
<td>0.65 48% 0.75</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.31 36% 0.67</td>
<td>0.54 35% 0.75</td>
</tr>
</tbody>
</table>

The percentages of grammatical missing subjects in N-children is higher than in PI-children, but surprisingly, there are no significant main effects for group, age or group*age interaction found\textsuperscript{16}. Differences between age groups can also be seen in Figure 5.3.

Figure 5.3  Development with age of percentage grammatical missing subjects (related to the topicalized missing subjects) in 45 N-children and 120 PI-children

\textsuperscript{16} ANCOVA with Grammatical missing subjects as dependent variable, Topicalized missing subjects as covariate and group (N-PI) and age (4-6-8yrs) as independent variables.

Despite the clear difference found in the youngest PI and N-children, the small differences found in the six and eight-year-olds probably cannot out a significant
main effect for group. We can therefore conclude that the PI-children and N-children have a comparable number of missing subjects as cases of discourse topic drop, despite the different behaviour in the youngest N and PI-children. Contrary to our expectations, PI-children use this discourse-organizing strategy as much as N-children, which illustrates good language skills.17

Finally, in Table 5.3 we present the ungrammatical missing subjects that include the missing subjects in initial position that do not fulfil the place and reference condition (type 3) and the missing subjects in non-initial position (type 4). Firstly, PI-children have significantly more ungrammatical missing subjects than N-children, as expected ($F(1,98)=7.260; p<.008)$.18

Table 5.3 Mean total number, percentage (related to all T-units with a finite verb) and standard deviation ungrammatical missing subjects in 45 N-children and 120 PI-children

<table>
<thead>
<tr>
<th>Ungrammatical Missing Subjects</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>4 yrs</td>
<td>1.27</td>
<td>3%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.33</td>
<td>1%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.40</td>
<td>1%</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.67</td>
<td>2%</td>
</tr>
</tbody>
</table>

Figure 5.4 shows the percentage ungrammatical missing subjects with age in both populations. Furthermore, the distribution of the categories ungrammatical type 3 and ungrammatical type 4 missing subjects is comparable in the two populations.19

---

17 Note the low number of cases of discourse topic drop in both populations. Probably, the acquisition of the place and reference condition is not finished in the age range under investigation.

18 ANCOVA with Ungrammatical missing subjects as dependent variable, all T-units with a finite verb as covariate and group (N-PI) and age (4-6-8yrs) as independent variables. No significant age and group*age interaction effects were found.

19 ANCOVA with Ungrammatical missing subjects as dependent variable, all missing subjects as covariate and group (N-PI) and age (4-6-8yrs) as independent variables. Age and group*age effect are not significant.
The ability to realize lexical categories

5.3.3 Conclusion: Missing Subjects

PI-children show more problems with realizing the external argument, the subject, than the N-children. Although the acquisition of the verb and its argument structure is not yet completed in N-children as shown by the many T-units with ungrammatical missing subjects, they do not omit them as frequently as the PI-children: PI-children have significantly more ungrammatical missing subjects in their interviews. N-children also show a clear linear decrease with age in leaving the subject in first position unexpressed in contrast to the PI-children. The problems in PI-children indicate difficulties in identifying the rule that in Dutch subjects mostly have to be expressed. The results confirm a real delay in the acquisition of grammatical rules, based on a delay in the acquisition of the most basic morphological/syntactic rule: be morphologically/syntactically as explicit as possible as is required for Dutch (see 12.4).

Surprisingly, the use of grammatical missing subjects (cases of discourse topic drop) is comparable in both groups of children. Both use this discourse-organizing strategy to establish co-referential relations and seem to have the ability to topicalize and understand that the entity must be recoverable from the discourse. This may be an artefact of the fact that the PI-children drop many more subjects in total. Some of
these will be referentially clear, but this does not mean that the children have necessarily acquired the discourse topic rule. However, since in Dutch subjects are mainly positioned in topic position, the chance to realize a correct topic drop by leaving the subject unexpressed is greater than making the error named ungrammatical missing subject. Nevertheless, we observed that too many of the missing subjects in PI-children cannot be explained as discourse topic drop, since these missing subjects do not have a fixed referent in the discourse. Later the semantic-pragmatic problems with co-reference (see 13.5 to 13.7) will be explored. The problems in realizing the subject (external argument) of the verb also may be also related to problems on the level of semantic-pragmatic function. Nevertheless, problems with the morphological/syntactic spell-out rules are evident.

5.4 Missing Objects

5.4.1 Research questions, definitions and operationalisations

The requirement for subjects is 'only' a requirement of syntactic predication, whereas for objects there is no such structural principle (Chomsky, 1981). The object is central to the meaning of the verb: the number, kind and obligatoriness of objects are marked for each verb in the lexicon. Verbs are divided into several subclasses: transitives, ditransitives and intransitives, according to the object arguments they take. This is language-specific. Transitive verbs take a direct object (Example 8 and 9), ditransitive verbs take both a direct and indirect object (Example 10), and intransitive verbs do not take objects and cannot be passivized (e.g. Haegeman, 1991; Haeseryn et al., 1997) (Example 11). In this chapter, we will only investigate the realization of direct objects that can be either obligatory (must be explicated) or optional (can be explicated) (Example 8 and 9), as will be explained in more detail below (see for a detailed discussion Thrift, 2003). For example, the Dutch verb 'maken' (to fix) is an obligatory transitive verb that takes a direct object (Haeseryn et al., 1997:50), as the scene to which it refers to in real life triggers the explicitation of the entity that is 'fixed' (Example 8).

Example 8 Obligatory transitive verb in Dutch: maken

Harmen maakt de fiets.
Harmen-fixes-the-bicycle.
(Harmen fixes the bicycle)

The Dutch verb 'eten' (to eat) is an optional transitive verb that can have a direct object, but the object is not necessary, since in this context the referent is clear (Example 9).20

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20 Pinker (1989) claims that the verb 'eten' (to eat) has two argument structures, respectively a transitive and an intransitive form.
The ability to realize lexical categories

Example 9  Optional transitive verb in Dutch: *eten*

Roodkapje eet [koekjes].
Little-Red-Riding-hood-eats-*biscuits*.
(Little-Red-Riding-hood eats *biscuits*).

An obligatory ditransitive verb is 'geven' (to give), because it takes two different obligatory objects, a direct object and an indirect object (Example 10).

Example 10  Obligatory ditransitive verb in Dutch: *geven*

Sinterklaas geeft Eva een boek.
Santeclaus-gives-*Eva-a-book*.
(Santeclaus gives *Eva a book*).

And 'zitten' (to sit) is an intransitive verb, which takes no object at all (Example 11).

Example 11  Intransitive verb in Dutch: *zitten*

Ik zit eindelijk.
I-sit-down-at-last.
(I sit down at last).

Children need to learn which verbs take obligatory objects and which verbs do not, and they do not always get the subcategorization of verbs right immediately (Pinker, 1989). Krämer (1995) found that Dutch-speaking children aged 1;8 to 3;1 distinguish between obligatory and optional objects from the start of acquisition, but that their knowledge of verb categorization is still incomplete at age three. Children drop many direct objects, since they not only have to learn for each predicate the number of arguments that it takes, but also the position of each argument in the argument structure. Children also have to learn that they can drop object arguments as topicalized objects, but only under specific conditions of place and reference. We want to determine whether the PI-children show problems with the realization of obligatory objects with transitive verbs comparable to the problems found with realizing obligatory subjects (5.3). Since the place condition of objects is very important, we will divide missing direct objects into those in initial and post verbal position.

Post-verbal missing direct objects indicate a real problem with the internal argument structure of a verb, since these missing objects always contribute to the ungrammaticality of a T-unit. Possibly, PI-children have problems with the post-verbal object comparable to those of Dutch SLI-children. Children with SLI show more problems with the realization of the direct object (internal argument) in post-verbal position than with the realization of the direct object in initial position (De Jong, 1999). SLI-children often select a verb frame that results in the absence of an overt internal argument.
We want to answer the following question: *is the number of grammatical and ungrammatical missing direct objects* (in initial and post-verbal position together) *in interviews with PI-children comparable to the average amount in interviews with N-children? And, is there a comparable development with age?*

The analysis of missing objects is based on the distinction between obligatory and optional objects with a transitive verb (Pinker, 1989), although this boundary is often unclear. Thompson and Hopper (1997) state that nearly all obligatory transitive verbs have a context available in conversation in which no expression of the obligatory argument is necessary. They relate the argument structure of verbs to the frequency of verbs in conversation. Highly frequent verbs have a less tight argument structure than low frequency verbs. Thus, highly frequent verbs more often permit an optional object, whereas low frequency verbs more often need the explicitation of an object, therefore called an obligatory object (Thompson and Hopper, 1997). Although this idea of putting verbs on a scale of object obligatoriness is quite attractive, other aspects seem even more important, such as the semantic loading of verbs in relation to the scenes to which these verbs refer, resulting in more than one type of argument structure with a specific verb (i.e. argument structure alternation). For example, the verb 'breken' (to break) can have a transitive (causative) structure with an internal and external argument (e.g. Tom is breaking the glass), and an intransitive structure with an internal argument, resulting in a change of location or state (e.g. the glass breaks). Children have to learn this intrinsic loading of verbs and store this verb frame information in their lexicon (e.g. Pinker, 1989; Wijnen and Verrips, 1998).

Despite the artificial distinction between obligatoriness and optionality (e.g. Van Hout, 1995, 1996), we made a list of transitive verbs in Dutch that take an obligatory object, following Krämer (1995), in order to capture the missing objects that cause ungrammaticality. On the basis of two tests the verbs were classified as obligatory or optional transitive (Haeseryn et al., 1997:50). First, if a transitive verb could appear without its object in the present tense, it was considered optional transitive (Example 12).

**Example 12** Optional transitive verb without an optional object in Dutch

Tijn drinkt.
Tijn-drinks.  
(Tijn drinks)

Second, if a transitive verb could not appear without an object, it was then tested to determine if it could appear object-less with the adverbial 'altijd' (always). If the T-unit was grammatical when appearing with 'altijd' (always) and without an object, it was classed as optional transitive (Example 13).
The ability to realize lexical categories

Example 13  Optional transitive verb without an optional object in Dutch

Lot krabt.  Lot krabt altijd.
Lot-scratches.  Lot-scratches-always.
(Lot scratches)  (Lot is always scratching)

If an ungrammatical T-unit was the result, it was classified as obligatory transitive (Example 14).

Example 14  Obligatory transitive verb with a missing obligatory object in Dutch

*Tijn maakt ∅  *Tijn maakt altijd ∅.
Tijn-fixes-∅  Tijn-fixes-always-∅.
(Tijn fixes ∅)  (Tijn fixes always ∅)

To determine the rate at which direct objects are missing, all the obligatory transitive verbs were selected based on these two 'tests'21. Direct objects have to be expressed with an obligatory transitive verb, whereas indirect objects have a more optional character. Obviously, T-units without a verb were excluded from the analysis of missing objects. Example 15 shows an missing obligatory object 'de pinguins' (the penguins) with a realized obligatory transitive verb 'zien' (to see).

Example 15  Missing obligatory direct object with a obligatory transitive verb in Dutch (PI-child; age 5;11)

Andre:  *#1 Maar ik had een keer ∅ op teevee gezien.
Paraphrasis:  #1 But-I-had-once-∅ on TV-seen.
(#1 But I had seen ∅ once on TV).

Maar ik had een keer <de pinguins> op TV gezien.
But-I-had-once <the penguins> on TV-seen.
(But I had seen <the penguins> once on TV).

Next, the implicit objects are divided in grammatical and ungrammatical omissions following the same procedure, i.e. place and reference condition, used with missing subjects (Figure 5.5)22.

In order to decide whether an NP is a direct object, comparable criteria to these were used in the analysis of missing subjects, namely context and word order. The basic position of an object in Dutch is mostly post-verbal with a finite verb, unless topicalization has taken place (see this section). Since topicalization is a restricted

---

21 Typical interjections or minors in Dutch like "weet je" (you know) and "kijk" (look) are not included in the analysis of obligatory transitive verbs.

22 STAP (Van den Dungen and Verbeek, 1994; 24, 1999) judges all initial missing objects as grammatical whether the referential relation is clear or not. A more differentiated approach with respect to the place and reference condition is necessary to judge whether a missing object in initial position is grammatical or not (De Haan and Tuijnman, 1988).
phenomenon in Dutch (e.g. De Haan and Tuijnman, 1988; Thrift, 2003), each time an NP in object position could conceivably have been intended as a subject, context would have to decide. Only missing objects in topic-position and referentially clear (type 2) establish cohesion and coherence in the interview and illustrate good language skills (more detail see also Chapter 14.4 and 15). Missings objects in topic position but referentially unclear (type 3) are judged as ungrammatical, because they do not fulfil the reference condition, but only the place condition. Finally, missing objects in non-topic position (type 4) are always judged as ungrammatical, because the place condition is not fulfilled.

Figure 5.5 Grammatical and ungrammatical missing objects

The analysis of missing objects includes the grammatical forms (type 2) and the ungrammatical forms (types 3 and 4). First, a grammatical missing object as a case of discourse topic drop (type 2) is shown (Example 16).

23 Unlike adult Dutch, adult English does not have a topic drop construction, whereby the finite verb licenses the dropping of the direct object (e.g. Haegeman, 1991, 1994).
The ability to realize lexical categories

Example 16: Discourse topic drop of an object in Dutch (PI-child; age 9;6)

Wendy:
Dat is een zwaar rekenboekje.
(That is a difficult mathematics book)

Wendy:
₀ heeft iedereen uit mijn klas
(Everybody has ₀ in my class).

Paraphrasis:
<Dat> [rekenboekje] heeft iedereen uit mijn klas
Everybody has <that> [mathematics book] in my class.

Example 16 fulfils the two conditions to establish discourse topic drop. There is an initial missing object marked with a preposed obligatory transitive verb 'hebben' (to have) and the referent of the missing element is clear: it refers to the last mentioned inanimate referent, namely 'rekenboekje' (mathematics book).

Example 17 shows a T-unit with the obligatory transitive verb 'doen' (to do) and an ungrammatical missing object in first position, but referentially unclear (type 3).

Example 17: Topicalized missing object but referentially unclear (PI-child; age 5;5)

The topic of conversation is playing with other children

Interviewer:
Speel je dan binnen of buiten?
(Do you play inside or outside the house?)

Mandy:
₀ doen we ook wel eens.
(We sometimes do ₀).

Paraphrasis:
<Binnen spelen> doen we ook wel eens.
(We sometimes play inside).

In Example 17, the direct object of the verb 'doen' (to do) is referentially unclear. It is not clear whether 'binnen spelen' (playing inside) or 'buiten spelen' (playing outside) is intended.

Finally, Example 18 shows a missing object in non-topic or post-verbal position with the obligatory transitive verb 'brengen' (to bring), which is always judged as ungrammatical (type 4). A missing object in post-verbal position together with an obligatory transitive verb contributes unconditionally to the ungrammaticality of the T-unit: this position needs to be filled with an explicit direct object.

Example 18: Missing object in non-topic or post-verbal position (PI-child; age 5;11)

Gerrit:
#2 En over een kwartier brengen we # ₀ wel weer terug.
#2 And-in-a-quarter-of-an-hour-bring-we-#-₀ again-back.

Paraphrasis:
En over een kwartier brengen we <de hondjes> wel weer terug.
(And we will bring <the puppies> back in a quarter of an hour).
5.4.2 Results: Missing Objects

We checked whether in 60 PI-children and 45 N-children the number of verbs that take an obligatory object was comparable\(^{24}\). This proved not to be the case: the N-children produced significantly more of this type of verb in 50 T-units (\(F(1,99)=6.193; p<.014\))\(^{25}\) (see Appendix 5c). Therefore the number of obligatory object verbs serves as covariate to evaluate the total number of missing obligatory direct objects.

First, we selected all the missing obligatory objects (grammatical and ungrammatical) in N and PI-children as preparation for the central part of the analysis of missing objects that is the selection of grammatical and ungrammatical cases. PI-children show significantly more missing objects than their age-matched peers (\(F(1,98)=8.455; p<.005\))\(^{26}\) (see Appendix 5c). Although a significant main effect for age is found in both populations (N-children: \(F(2,42)=9.157; p<.001\) and PI-children: \(F(5,114)=3.610; p<.005\)), only the N-children show a linear decrease with age in omitted objects (\(p<.000; \text{Eta squared} .30; \text{R squared} .25\)). Comparable to the results found with missing subjects, PI-children show too many missing objects.

Second, the missing objects were subjected to the place condition: all missing objects in topic position were selected. N-children express the object in topic position more frequently than the PI-children, but the differences are not sufficient to result in significant main effects\(^{27}\) (see Appendix 5d). So PI-children are comparable to N-children related to topicalized missing objects.

Third, we selected topicalized missing objects that are referentially clear: the grammatical missing objects. When we look at the percentages of grammatical missing objects in the N- and PI-children (aged 4, 6 and 8) in Table 5.4, we see that PI-children show a significantly lower number of grammatical missing objects (45%) than N-children (61%) (\(F(1,98)=6.125; p<.015\))\(^{28}\). These fewer grammatical missing objects in initial position in the PI-children – the real cases of discourse object drop – indicate that the PI-children are less sophisticated in using discourse-organizing strategies that reflect good morphological/syntactic and semantic/pragmatic language skills. We have to take into account the fact that the PI-children drop many more objects in total. Some of these implicit objects are referentially clear, but this does not mean that the children have necessarily acquired the discourse topic rule.

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\(^{24}\) The production of obligatory object verbs will also be discussed in more detail in Chapter 8, which presents the complexity of lexical categories, especially lexical verbs.

\(^{25}\) ANOVA with Obligatory object verbs in 50 T-units as dependent variable and group (N-PI) and age (4-6-8yrs) as independent variables.

\(^{26}\) ANCOVA with Missing objects as dependent variable, Obligatory object verbs in 50 T-units as covariate and group (N-PI) and age (4-6-8yrs) as independent variables. The interaction-effect was not significant.

\(^{27}\) ANCOVA with Topicalized missing objects as dependent variable, Total number of missing objects as covariate and group (N-PI) and age (4-6-8yrs) as independent variables.

\(^{28}\) ANCOVA with Grammatical missing objects as dependent variable, Topicalized missing objects as covariate and group (N-PI) and age (4-6-8yrs) as independent variables. No significant age and group*age interaction effect were found.
The ability to realize lexical categories

What is more, if the PI-children make appropriate grammatical topicalized missing objects, they do this in rather stereotypical and simple utterances, for example: Ø weet ik niet (I do not know Ø), in which the preposed pronoun 'dat' (that) is not realized. This preposed null pronoun always referred to the preceding question of the interviewer and was interpreted as referentially appropriate. Some children had quite a large number of these stereotypical answers, which influences the number of grammatical missing objects positively. These types of grammatical missing object do not reflect good language skills, however.

Table 5.4  Mean total number, percentage grammatical missing objects (related to total number of missing objects) in 45 N-children and 120 PI-children

<table>
<thead>
<tr>
<th>Grammatical Missing Objects</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x  %   sd</td>
<td>x  %   sd</td>
</tr>
<tr>
<td>Place/Reference condition fulfilled:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>2.07  62%  1.91</td>
<td>2.30  58%  3.23</td>
</tr>
<tr>
<td>5 yrs</td>
<td>-    -</td>
<td>0.70  44%  0.80</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.73  65%  1.16</td>
<td>0.90  44%  1.12</td>
</tr>
<tr>
<td>7 yrs</td>
<td>-    -</td>
<td>1.00  38%  1.26</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.47  51%  0.92</td>
<td>0.65  34%  0.88</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-    -</td>
<td>0.80  50%  1.01</td>
</tr>
<tr>
<td>Total mean</td>
<td>1.09  61%  1.53</td>
<td>1.06  45%  1.38</td>
</tr>
</tbody>
</table>

From Figure 5.6 we see that with age N and PI-children differ, although – contrary to our expectations – with age no increase in grammatical missing objects can be observed.

Figure 5.6  Development with age of percentage grammatical missing objects (related to total number of missing objects) in 45 N-children and 120 PI-children
Finally, Table 5.5 shows the real ungrammatical missing objects in initial and non-initial position in both populations. Obviously, PI-children have significantly more ungrammatical missing objects than N-children (F(1,98)=11.516; p<.001) and there is a significant age effect found in both populations (F(2,98)=4.495; p<.014)\textsuperscript{29}. As expected, the younger N-children show significantly more ungrammatical missing objects than the older N-children, an almost linear development is found (F(2,41)=3.924; p<.028; Eta squared .11; R squared .08)\textsuperscript{30}; this is not found in PI-children\textsuperscript{31}.

Table 5.5  
Mean total number, percentage (related to 50 T-units) and standard deviation obligatory object verbs and mean total number, percentage (related to total number of obligatory object verbs) and standard deviation ungrammatical missing objects in 45 N-children and 120 PI-children

<table>
<thead>
<tr>
<th>Obligatory object verbs</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>4 yrs</td>
<td>20.47</td>
<td>41%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6 yrs</td>
<td>21.35</td>
<td>43%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8 yrs</td>
<td>20.87</td>
<td>42%</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>20.90</td>
<td>42%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ungrammatical missing objects</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>4 yrs</td>
<td>1.13</td>
<td>5%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.47</td>
<td>2%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.47</td>
<td>2%</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.69</td>
<td>3%</td>
</tr>
</tbody>
</table>

\textsuperscript{29} ANCOVA with Ungrammatical missing objects (related to total number of obligatory object verbs in 50 T-units) as dependent variable and group (N-PI) and age (4-6-8yrs) as independent variables. The interaction-effect was not significant.

\textsuperscript{30} One-way ANOVA with Ungrammatical missing objects (related to total number of obligatory object verb in 50 T-units) as dependent variable and age (4-6-8yrs) as independent variable in N-children.

\textsuperscript{31} One-way ANOVA with Ungrammatical missing objects (related to total number of obligatory object verbs in 50 T-units) as dependent variable and age (4-5-6-7-8-9yrs) as independent variable in PI-children.
The ability to realize lexical categories

It is obvious that PI-children are not comparable to N-children with regard to the number of the ungrammatical missing objects in initial and non-initial position. The evidence from the results supports the idea that N-children with age know better which verb frame triggers an obligatory object than PI-children. The results do show some development with regard to expressing an obligatory object in PI-children between four and nine years of age, although it does not run parallel to normal development (Figure 5.7).

Figure 5.7  Development with age of percentage ungrammatical missing objects (related to total number of obligatory object verbs) in 45 N-children and 120 PI-children

![Graph showing development with age of percentage ungrammatical missing objects](image)

We will pay special attention to the post-verbal missing direct objects that contribute unconditionally to ungrammaticality (5.4.1). In Table 5.6 we see that the PI-children have significantly more post-verbal missing objects than the N-children (F(1,98)=5.133; p<.026)\(^2\).

Table 5.6  Mean total number, percentage (related to total number of obligatory object verbs) and standard deviation post-verbal missing objects in 45 N-children and 60 PI-children

<table>
<thead>
<tr>
<th>Ungrammatical post-verbal missing objects</th>
<th>N-children (n=45)</th>
<th>PI-children (n=60)</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>%</td>
<td>sd</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------</td>
<td>----</td>
</tr>
<tr>
<td>4 yrs</td>
<td>0.93</td>
<td>4.27%</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.40</td>
<td>1.56%</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.40</td>
<td>1.86%</td>
</tr>
<tr>
<td><strong>Total mean</strong></td>
<td><strong>0.58</strong></td>
<td><strong>2.56%</strong></td>
</tr>
</tbody>
</table>

\(^2\) ANCOVA with Post-verbal missing objects as dependent variable, Obligatory object verbs in 50 T-units as covariate and group (N-PI) and age (4-6-8yrs) as independent variables. No significant group*age interaction effect was found.
This indicates problems with the verb frame. Although the percentages are low, within the N-children a significant linear development with age is found. These findings support the idea that the older N-children of six and eight years are still developing in terms of making the obligatory internal argument explicit (F(2,41)=3.577; p<.037)\(^{33}\). Contrary to expectations, we find that PI-children do not show a development with age in making post-verbal objects explicit\(^{34}\) (see Figure 5.8).

![Figure 5.8](image)

### Development with age of percentage ungrammatical post-verbal missing objects (related to total number of obligatory object verbs) in 45 N-children and 60 PI-children

**5.4.3 Conclusion: Missing Objects**

PI-children have significantly more missing direct objects that contribute to ungrammaticality than the N-children of the same age. The results of the ungrammatical missing objects in post-verbal position confirm these results. PI-children seem to have significantly more problems with the verb frame. N-children (with age) know better which verb frame triggers an obligatory object than PI-children. Probably, the lexicon of PI-children is more restricted with regard to obligatory transitive verbs (see also 8.6). The results of the ungrammatical missing objects indicate a real delay in the acquisition of grammatical rules. Moreover, to establish cohesion and coherence in the interviews PI-children sometimes do use discourse topic drop, but they use this linguistic tool significantly less frequently than their age-peers. The instances of discourse topic drop do not mean that PI-children have necessarily acquired the rules for establishing discourse topic drop, since often the referent of a missing object could not be identified from the context in interviews with PI-children. The problems in realizing the object of the

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\(^{33}\) One-way ANOVA with Post-verbal missing objects as dependent variable, Obligatory object verbs in 50 T-units as covariate and age (4-6-8yrs) as independent variable in N-children.

\(^{34}\) One-way ANOVA with Post-verbal missing objects as dependent variable, Obligatory object verbs in 50 T-units as covariate and age (4-5-6-7-8-9yrs) as independent variable in PI-children.
verb may also be related to the problems on the level of pragmatic function, i.e.
establishing coreferential relations (see 13.5 to 13.7). Krämer (1995) and Bol (1996) observed an asymmetry between missing subjects and 
objects in their Dutch data. These results contradict those of De Haan and Tuinjman 
(1988), who postulate that Dutch as a topic drop language shows no subject/object 
asymmetry, as is recently confirmed by Thrift (2003). Therefore, we checked if there 
is such an asymmetry between missing subjects and missing objects in the PI-
children compared to the N-children. We present the results in the next section.

5.5 The distribution of Ungrammatical Missing Subjects and Objects

5.5.1 Research questions, definitions and operationalisations

From the literature (e.g. Hyams and Wexler, 1993; Hyams, 1994) a larger number of 
missing subjects than objects might be expected in English. Subjects tend to more 
often represent given information whereas objects tend to represent new information
normally developing children in the age range from 1;7 to 3;7 years a significant 
asymmetry between missing subjects and objects in favour of objects, also observed
in German-speaking children (Boser, 1992). In topic drop languages normally 
developing children drop more objects then subjects in obligatory contexts
(Weerman, 1989). These results could imply that normally developing children have
to determine which information is given and which information is new in relationship
to grammar. Children have to learn that only old information is redundant and new
information has to be explicated (Allen, 1998). However, the opposite is found by
Thrift (2003) in Dutch children (aged 1;8 to 3;1) in which the rates of subject drop
did not differ substantially from the rates of object drop.

In particular, we want to determine whether the symmetrical pattern found for
subject and object drop found in young Dutch normally developing children holds
across older Dutch-speaking children in the N- and PI-population. We expect to find
more missing subjects than objects in the conversational genre in Dutch-speaking N
and PI-children (age four, six and eight years), since subjects (initial preverbal
position; topic) often reflect old information that might be redundant, and therefore
can be left unexpressed when topicalized, whereas objects (post-verbal position;
focus) might reflect often new information, that cannot be left unexpressed.

Consequently, we want to answer the following question: are there more
ungrammatical missing subjects than missing objects in interviews with N- and PI-
children? We also wanted to answer the question: is there a correlation between the
number of ungrammatical missing subjects and missing objects in interviews with
N- and PI-children? This would reflect more general and severe morphological/
syntactic problems with grammaticality.

Statistical analyses are carried out using Pearson's product-moment-correlation
coefficient to compare the percentages of ungrammatical missing subjects (related to
all T-units with a finite verb) and the percentages of ungrammatical missing objects
(related to the total number of obligatory object verbs in 50 T-units) in both populations.

**5.5.2 Results: Distribution Ungrammatical Missing Subjects and Objects**

The distribution of ungrammatical missing subjects and obligatory objects in both populations is shown in Table 5.7. Although the percentages suggest that we observed more ungrammatical missing objects in T-units with obligatory object verbs than ungrammatical missing subjects in T-units with a finite verb in both N- and PI-children, these differences are not significant\(^{35}\). Thus, there is no relation between the occurrence of missing subjects and missing objects observed within both populations. The reason is that individual variation between individuals within age groups was relatively high: some N- or PI-children have more missing subjects than objects, whereas other children have more missing objects than subjects, whereas some show the same proportion. Contrary to the developmental literature, we do not observe a significant asymmetrical distribution between missing subjects and objects.

<table>
<thead>
<tr>
<th>Table 5.7 Percentage ungrammatical missing subjects and objects in 50 T-units in 45 N-children and 60 PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage Ungrammatical Missing Subjects/Objects</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>4yrs</td>
</tr>
<tr>
<td>6yrs</td>
</tr>
<tr>
<td>8yrs</td>
</tr>
<tr>
<td>Total mean</td>
</tr>
</tbody>
</table>

We then explored how missing subjects correlated with missing objects within both populations (Table 5.8). Although we observed that even clustering of ungrammatical missing subjects and objects occurred within single T-units expressed by PI-children that never occurred in N-children, we did not analyze this in detail. A highly significant relation is found between the two kinds of missing arguments in PI-children ($r=.452; p<.000$), but not in the N-children ($r=.234; p<.061$)\(^{36}\).

\(^{35}\) Pearson's product-moment-correlation (pmc) coefficient with variables percentage ungrammatical missing subjects (related to all T-units with a finite verb) and percentage ungrammatical missing objects (related to the total number of obligatory object verbs in 50 T-units) in 45 N-children and 120 PI-children.

\(^{36}\) Pearson's pmc coefficient with variables percentage ungrammatical missing subjects (related to all T-units with a finite verb) and percentage ungrammatical missing objects (related to the total number of obligatory object verbs in 50 T-units) in 120 PI-children.
Table 5.8 Pearson's correlation coefficient and significance level of proportion ungrammatical missing subjects and objects in 45 N-children and 120 PI-children

<table>
<thead>
<tr>
<th>Pearson's correlation coefficient</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ungrammatical Missing Subjects and Objects</td>
<td>value</td>
<td>sign.</td>
</tr>
<tr>
<td>4yrs</td>
<td>-0.009</td>
<td>0.490</td>
</tr>
<tr>
<td>5yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6yrs</td>
<td>-0.01</td>
<td>0.500</td>
</tr>
<tr>
<td>7yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8yrs</td>
<td>.414</td>
<td>0.060</td>
</tr>
<tr>
<td>9yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>.234</td>
<td>0.061</td>
</tr>
</tbody>
</table>

* Correlation is significant at the .05 level (1-tailed).
** Correlation is significant at the .01 level (1-tailed).

These results are found separately for the age groups of the four, the five, the six and also for the nine-year-old PI-children. Only the seven-year-old and the eight-year-old PI-children have a non-significant relation between the frequency of missing arguments.

5.5.3 Conclusion: Distribution Ungrammatical Missing Subjects and Objects
Remarkably, a subgroup of PI-children with a relatively high number of missing subjects also has a relatively high number of missing objects. A similar symmetrical pattern in argument drop is found by Thrift (2003) in younger Dutch children. These findings indicate that PI-children cannot distinguish between old and new information in the sentence. The N-children do not show this correlation in missing arguments. PI-children find it more difficult to realize thematic roles with the produced verb compared to N-children. The missing arguments contribute considerably to the ungrammaticality of the T-unit (see 4.2 and 4.3).

5.6 Missing Prepositions

5.6.1 Research questions, definitions and operationalisations
We want to know if the PI-children also show clear morphological/syntactic problems in realizing prepositions compared to the N-children. Lexical prepositions are essentially relational elements, connecting verbs to the argument or to adjunct nominals associated with them within the T-unit. Prepositions constitute a relatively closed class, but new prepositions or complex prepositions may be added to the language (cf. because of, in spite of). Prepositions usually require a NP complement, either lexical or pronominal and therefore can be argued to have argument structure.
For instance the preposition 'in' (in or on) will have two arguments: an agent and a location (Haegeman, 1991:40). The syntactic category of such a prepositional phrase is lexically determined: a prepositional phrase (PP) is headed by the lexical category preposition (P). The ordering constraints found in natural languages vary cross-linguistically, being learned through exposure. Very little data will suffice for children to fix these ordering constraints for example, preposition plus noun, in Dutch.

Prepositional phrases serve two main purposes (Berman and Slobin, 1994:159). First, they mark adverbial relations which elaborate on some facet of the relation between an event and the circumstances of its occurrence, as for example in 'Mijn vader heeft een boot in de achtertuin' (My father has a boat in the back yard) (type 1). Second, they mark case relations between the predicate and its associated nominals, as for example in 'Sinterklaas geeft een boek aan Eva' (Santa Claus gives a book to Eve) (type 2). Prepositions are therefore connectors between the verb and its arguments or adjunct nominals.

From the developmental literature, we know that from the age of three years normally developing children use prepositional phrases that are often well-formed. Children first learn to use prepositional phrases with a spatial function for specifying locative trajectories (type 1), only later assigning these forms to a more abstract semantic content, using them in more complex syntactic constructions (type 2) (e.g. Berman and Slobin, 1994). For Dutch a detailed description of prepositional development is given by Verhulst-Schlichting (1996).

Little to nothing is known about the development of prepositions in psychiatrically disordered children, although we might expect some problems, as a missing preposition within a prepositional phrase causes ungrammaticality. We want to answer the following question: is the number of missing prepositions in prepositional phrases in interviews with PI-children comparable to the average amount in interviews with N-children? And, is there a comparable development with age?

Before we turn to the analysis of missing prepositions, we compared how many phrasal constituents that need a preposition were included in interviews with the PI-children compared to the N-children (Haeseryn et al., 1997:915). Here only prepositions will be discussed. Particles will be discussed later (see 8.7 and 9.4). Particles can be attached to bare verbs (without associated nominal) to provide semantic information about aspect and directionality, whereas prepositions cannot. The assumption is that verb-particle combinations are earlier in language acquisition than verb-preposition phrases in English-speaking children (Bloom, 1973; Brown, 1973), although no information about this development is available for Dutch (see 8.7).

To determine the rate at which prepositions are missing, the total number of prepositional phrases (PP) in 50 T-units are used, including the grammatical and the ungrammatical PP forms. More than one PP can occur in one T-unit. In Example 19
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a missing preposition is shown in a PP, which marks an adverbial relation between an event and the circumstances of its occurrence, namely the place of the event.

**Example 19**  Missing preposition in a PP, which marks an adverbial relation between the event and the circumstances of its occurrence in Dutch (PI-child; age 4;10)

Richie:  Joey slaapt Θ ze eigen kamer.
Joey-sleeps-Θ his-own-room.
(He sleeps his own room).

Paraphrasis:  Joey slaapt <in> zijn eigen kamer.
Joey-sleeps <in>-his-own-room.
(He sleeps <in> his own room).

In Example 19, the preposition 'in' (in) in the PP is missing, which results in an ungrammatical T-unit. Example 20 shows a type of missing preposition in a PP, that marks case relations between the predicate and its associated nominals.

**Example 20**  Missing preposition in a PP, which marks a case relation between the predicate and the nominal in Dutch (PI-child; age 8;4)

Richie:  Ik heb plastikke schildpadde.
I-have-plastic-turtles.

Richie:  en mijn vriendje in de klas en ik die sparen [geld sparen] Θ een echt schildpadje.
And-my-friend-at-school-and-I-saving [saving money]-Θ a-real-turtle[little].
(And I and my friend at school are saving a real little turtle).

Paraphrasis:  en mijn vriendje in de klas en ik die sparen <voor> een echt schildpadje.
And-my-friend-at-school-and-I-saving <for>-a-real-turtle[little].
(And I and my friend at school are saving <for> a real little turtle).

In Example 20, part of the complement to the verb 'geld sparen' (saving money) is realized, but the crucial lexical head, the preposition 'voor' (for), is missing. The semantic context of the verb requires an explicit preposition. All different types of missing prepositions are included in the analysis.

5.6.2 Results: Missing Prepositions

Before we present the results of missing prepositions, we first show the total number of realized prepositional phrases (PP) in 50 T-units by the children, since a realized PP is the context for an omitted preposition. On the basis of developmental research the expectation is that children show more structural complexity with age and therefore will also realize more PP's in their sentences and sometimes more than one in a single T-unit. If there are significant differences in the total number of prepositional phrases (PP) between the groups, then the PP's will be used as covariate in the analysis.

Table 5.9 (upper part) shows the results of the PP's used in both groups: PI-children do have slightly less PP's in their interviews compared to N-children, but this
difference is not significant\(^{37}\). The number of PP's is therefore not used as covariate in the analysis of missing prepositions.

**Table 5.9**

Mean total number and standard deviation realized prepositional phrases (PP) (in 50 T-units) and mean total number, percentage (related to mean total number of realized prepositional phrases) and standard deviation missing prepositions in 45 N-children and 60 PI-children

<table>
<thead>
<tr>
<th>Realized PP's/ Missing prepositions</th>
<th>N-children n=45</th>
<th>PI-children n=60</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td><strong>Realized PP's</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>16.06</td>
<td>-</td>
</tr>
<tr>
<td>6 yrs</td>
<td>18.00</td>
<td>-</td>
</tr>
<tr>
<td>8 yrs</td>
<td>18.33</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total mean</strong></td>
<td>17.47</td>
<td>-</td>
</tr>
<tr>
<td><strong>Missing prepositions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>0.60</td>
<td>4%</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.53</td>
<td>3%</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.20</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Total mean</strong></td>
<td>0.44</td>
<td>3%</td>
</tr>
</tbody>
</table>

However, Table 5.9 (lower part) shows that PI-children have significantly more missing prepositions within a PP than N-children (\(F(1,99)=7.047; \ p<.009\))\(^{38}\). From Figure 5.9 it is clear that with age both N- and PI-children learn to express the obligatory preposition of a prepositional phrase. The N- and PI-children show a decrease with age in the number of missing prepositions, but the differences between the year groups are not substantial. The oldest PI-children even have slightly more missing prepositions than the youngest N-children, signalling a delay in the development of realizing prepositions in obligatory contexts.

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\(^{37}\) ANOVA with total number of realized prepositional phrases as dependent variable and age (4-6-8yrs) as independent variable is used in the N- and PI-children. No significant age effect was observed, although in the N-children a slight increase with age is found in producing PP's, whereas the PI-children show a slight decrease with age.

\(^{38}\) ANOVA with total number of missing prepositions as dependent variable and age (4-6-8yrs) as independent variable is used in the N- and PI-children. No significant age and group*age interaction effect were found.
5.6.3 Conclusion: Missing Prepositions
The number of PP's realized is comparable in the N and PI-children, and in most cases the N-children (97%) and PI-children (94%) realize an obligatory preposition within a PP. Although these results suggest that PI-children are capable of producing PP's, using these types of phrase structures to mark case relations between the predicate and its associated nominals or adverbial relations, we signalled significantly more missing prepositions within a PP in PI-children compared to N-children. This will contribute towards making the messages of PI-children unintelligible.

5.7 Missing Adverbials

5.7.1 Research questions, definitions and operationalisations
We want to know if the PI-children also show clear morphological/syntactic problems in realizing adverbials, such as place and time adverbials, when compared to the N-children. Space and time are the most fundamental categories of orientation in the world and are semantic relations that can be morphologically/ syntactically expressed by adverbials or adverbial phrases in Dutch (Haegeman, 1991). Adverbials/adverbial phrases can also reflect, for example, the manner in which events occur.

In general, adverbials or adverbial phrases can mostly be left unexpressed without causing ungrammaticality. They can be judged as structure-neutral, which gives them – from a morphological/syntactic point of view – an optional character within the sentence frame (Van Zonneveld, 1994). However, a skilful conversation about personal experiences does not simply consist of a linear chain of successive clauses located in space and time. Daily life events must be hierarchically packaged in space and time, making adverbials – from a semantic-pragmatic point-of-view – less optional, triggered by general principles of discourse organization (Comrie, 1985) (see 12.5).
The vantage point from which spatial and temporal consistency is created, usually does not exist inside the sentence frame, but lies 'outside' of it (Langacker, 1985; Dik, 1989). Temporal notions are not only expressed by temporal adverbials (see this section and 6.3) and connectives (see 13.3), called sentence external markers, but are also grammaticalized by tense and aspect markers (see 7.2 and 7.3), called sentence internal markers.

From the developmental literature, we know that space and time markers develop quite differently (e.g. Gillis and De Houwer, 1998; Hickmann, 2003). With respect to space, sentence external markers within clauses develop before sentence internal markers, whereas for time markers sentence internal markers develop before sentence external markers. Additionally, yet another developmental pattern is signalled: spatial expressions are acquired before temporal expressions. Spatial expression of an event appears before temporal expression, because temporal reference is cognitively more complex to acquire than spatial reference. The earliest and most basic form of a spatial adverbial relating the "here-and-now" location of the speech event to the location of a conversational event is the adverbial 'daar' (there). Children in the one-word and early two-word-stage are already able to express several temporal notions with a limited vocabulary before the onset of tense inflection (Behrens, 1993).

Next, normally developing children from age two first have to learn to provide spatial and temporal information inside the clause frame, before they can use more integrated spatial and temporal information between clauses. From the age of 2;0 years children use clause-internal spatial information. The usage is at first quite limited to certain lexical forms that adverbials take (Bamberg, 1994). The first marking of temporal notions in children's speech is typically through the verb inflectional system. The next development, around age 2;6, is characterized by an increase in the number of auxiliaries and/or inflections, which come to be used in more varied contexts (Behrens, 1993). At this age also temporal distinctions are made by sentence-modifying adverbials (Bamberg, 1994:206). Children eventually learn to coordinate the deictic temporal axis of events with the non-deictic time axis of discourse around the age of 3;0 to 3;6 (Berman and Slobin, 1994). Different studies have suggested that in constructing the non-deictic relations of temporal reference, children progress from juxtaposing two independent clauses, which express events in their order of occurrence, to sequentially relating two clauses with adverbials that preserve order of occurrence too. Finally, free use of adverbials without attention to correspondence between order of occurrence and of mention are acquired.

Notwithstanding the differentiation between time or place, in Dutch adverbials appear to be fairly common at the early age of 2;0 years (Bol and Kuiken, 1988:56-57). Around the age of 3;0 years children can combine two adverbials in one clause in addition to a verb and its arguments (Verhulst-Schlichting, 1987:53). Although relatively little is known about the kind of adverbials that young Dutch-speaking children use, De Houwer (1990) found a wide variety of place adverbials in normally developing children between the age of 2;7 and 3;4. Time adverbials, however, were
largely limited to 'nu' (now) and 'dan' (then), and adverbials of manner were largely limited to the form 'zo' (this way; like this).

With respect to psychiatrically disordered children, we know nothing about their acquisition of place, time and other adverbials and adverbial phrases and therefore the following question is asked: *is the number, type and distribution of missing adverbials or adverbial phrases in interviews with PI-children comparable to the average amount in interviews with N-children? And, is there a comparable development with age?*

To determine the rate at which adverbials/adverbial phrases where missing, all missing adverbial forms in 50 T-units were counted in an obligatory context, that is when adverbial phrases are partly realized but not completed (Haeseryn et al., 1997:905). These omissions cause ungrammaticality of the T-unit, as is shown in Example 21.

Missing adverbial forms could consist of a single adverbial or an adverbial phrase. The missing adverbials were also specified in three types, which mark the place of an event, the time of an event and information 'other' than place or time, so-called adverbials of an 'other type', according to definitions of STAP (Van den Dungen and Verbeek, 1994, 1999).

The adverbials or adverbial phrases of place and time are more easy to differentiate compared to the average types of adverbials. The *adverbials of place* mark the place, direction or source of an event, like in 'en dan springt hij in de zandbak' (and then he jumps into the sandbox). Example 21 shows a missing adverbial of place in an obligatory context.

**Example 21**  
*Missing adverbial of place in Dutch (PI-child; age 8;3)*

Jeffrey:  
(en eh) of we spelen vuilnisauto, dat ik die container ben.  
(and eh) or-we-play-rubbish truck-that-I that-container-am.  
Jeffrey:  
(dan pak ik ze benen vast.  
(then got-I-his-legs-hold-of.  
Jeffrey:  
(hij houdt me vast.  
(he holds me tight.

**Paraphrase:**  
en dan gaat hij ineens +" hup 0".  
and-then-goes-he-suddenly +" hup 0".  
(and then suddenly he goes "hup" 0).

In Example 21, the adverbial part of the verb, 'omhoog' (in the air), is not realized, whereas the realization of the adverbial 'ineens' implies that there should be another

---

39 +" is a CHILDES symbol for directed speech (see also Appendix 4a).
adverbial to complete the T-unit. This adverbial part expresses the direction of the verb 'gaan' (to go). The omitted particles in case of the use of a particle verb are not counted in the analysis under investigation.

*Temporal adverbials* mark the starting/end point, duration and frequency of an event, like in 'en morgen gaat hij voor het eerst naar school' (and tomorrow he goes for the first time to school). In Example 22, the adverbial of time is missing.

**Example 22**  
*Missing adverbial of time in Dutch (PI-child; age 4.5)*

Kimberley:  
- dan gaan we naar bed.  
- then go-we-to-bed.

Kimberley:  
- Ø moet je altijd slapen, als je donker is.  
- Ø must you always sleep if you is dark.

Paraphrasis:  
- <dan> moet je altijd slapen, als het donker is.  
- (<then> you must sleep always if it is dark).

In Example 22, the sentence-initial adverbial of time 'dan' (then) is missing that relates the event in the produced T-units. Sometimes the missing time adverbial in first position is discourse motivated. According to STAP all missing elements in first position must be judged as grammatical, except for missing subjects in first position (Van den Dungen and Verbeek, 1994, 1999:24). However, in order to gain insight into the abilities of PI-children to realize temporal and spatial information, we included the sentence-initial missing adverbials of time, like 'dan' (then) and 'toen' (then), in the analysis of missing adverbial information within the sentence frame.

The last category *adverbials of other types* are expressions of information of manner, state, degree, causality, modality, comparison, negation, restriction, etc. In the following some Dutch examples are given: an adverbial of degree is for example 'erg' (severe), of causality is 'door de regen' (by rain), of modality is 'gelukkig' (happily), of comparison is 'vergeleken met Sophie' (compared to Sophie), of negation is 'niet' (not), and of restriction is 'voor een kabouter' (in case of an elf) (e.g. Haeseryn et al., 1997:1200). Example 23 shows a missing adverbial of manner.

**Example 23**  
*Missing adverbial of other type in Dutch: missing adverbial of manner (PI-child; age 8.11). The topic of the conversation is art-swimming.*

Shamel:  
- en dan zit je boven water meestal.  
- (and then you are generally above water).

Shamel:  
- dan is dit zo.  
- then is-it-so.

%gpx\(^{40}\):  
- greef stand benen aan met armen  
- then stand legs with arms

%gpx:  
- explanation position legs with arms  
- (then it is like this).

\(^{40}\) %gpx is the CHILDES symbol for gestural and proximal information (see Appendix 4a).
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Shamel: en dan zit dit $\Theta$.
and-then-sits-it $\Theta$.
(and then it sits $\Theta$).

Paraphrase: en dan zit dit <zo>.
and-then-sits-it <this way>.
(and then it sits this way).

In Example 23, the adverbial of manner 'zo' (this way) is missing in an obligatory context of the used verb 'zitten' (to sit). This example shows the problem of expressing the manner of the event. All different types of missing adverbials/adverbial phrases are included in the analysis.

5.7.2 Results: Missing Adverbials
Table 5.10 shows that PI-children have significantly more missing adverbials in general than N-children ($F(1,99)=23.204; p<.000^{41}$).

Table 5.10 Mean total number, percentage (related to 50 T-units) and standard deviation missing adverbials in 45 N-children and 60 PI-children

<table>
<thead>
<tr>
<th>Missing Adverbials</th>
<th>N-children n=45</th>
<th>PI-children n=60</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>Missing adverbials in general</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>1.80</td>
<td>4%</td>
</tr>
<tr>
<td>6 yrs</td>
<td>1.93</td>
<td>4%</td>
</tr>
<tr>
<td>8 yrs</td>
<td>1.67</td>
<td>3%</td>
</tr>
<tr>
<td>Total mean</td>
<td>1.80</td>
<td>4%</td>
</tr>
</tbody>
</table>

To examine whether a specific type of adverbial relation is the cause of the high number of missing adverbials in the PI-children, the different types of adverbials are investigated: the spatial, temporal and 'other' (Table 5.11). Remarkably, the PI-children have significantly more missing adverbials of place $F(1,99)=6.038; p<.016^{42}$, more missing adverbials of time $F(1,99)=9.442; p<.003^{43}$ and more missing adverbials of other type $F(1,99)=21.160; p<.000^{44}$ than the N-children.

41 ANOVA with Missing adverbs in general as dependent variable and group (N-PI) and age (4-6-8yrs) as independent variables. No significant age or group*age interaction effect were found.
42 ANOVA with Missing adverbs of place as dependent variable and group (N-PI) and age (4-6-8yrs) as independent variables. No significant effect for age or group*age interaction effect were found.
43 ANOVA with Missing adverbs of time as dependent variable and group (N-PI) and age (4-6-8yrs) as independent variables. No significant effect for age or group*age interaction effect were found.
44 ANOVA with Missing adverbs of other type as dependent variable and group (N-PI) and age (4-6-8yrs) as independent variables. No significant effect for age or group*age interaction effect were found.
Table 5.11 Mean total number, percentage (related to the total number of missing adverbials in general) and standard deviation missing adverbials of place, time and other type in 45 N-children and 60 PI-children

<table>
<thead>
<tr>
<th>Different types of Missing Adverbials</th>
<th>N-children n=45</th>
<th>PI-children n=60</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>Missing adverbials of place</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>0.20</td>
<td>11%</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.00</td>
<td>0%</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.00</td>
<td>0%</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.07</td>
<td>4%</td>
</tr>
<tr>
<td>Missing adverbials of time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>1.20</td>
<td>67%</td>
</tr>
<tr>
<td>6 yrs</td>
<td>1.47</td>
<td>76%</td>
</tr>
<tr>
<td>8 yrs</td>
<td>1.53</td>
<td>92%</td>
</tr>
<tr>
<td>Total mean</td>
<td>1.40</td>
<td>78%</td>
</tr>
<tr>
<td>Missing adverbials of other type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>0.40</td>
<td>22%</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.47</td>
<td>24%</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.13</td>
<td>8%</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.33</td>
<td>18%</td>
</tr>
</tbody>
</table>

When we look at the distribution of categories, both populations show the most problems in realizing adverbials of time with respect to the other two types of adverbials (Figure 5.10). The problems with expressing temporal information contribute importantly to the problems found with adverbial information in general in the two groups. Whereas 6 and 8-year-old N-children seem to have overcome their problems with adverbials of place, these problems have not disappeared in the oldest PI-children. The results found in the N-children are in line with the expectation that adverbials of place are acquired earlier than adverbials of time (Gillis and De Houwer, 1998).
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Figure 5.10  Distribution of the percentage missing adverbials of place, time and other type (related to the total number of missing adverbials in general) in 45 N-children and 60 PI-children

We conclude that PI-children are not comparable to N-children: they leave spatial, temporal and adverbial information of other types implicit in obligatory contexts too often. Finally, the correlation between the distribution of the different types of missing adverbials is investigated and shown in Table 5.12. The first Pearson correlation coefficient per age group concerns the correlation between errors of place and time (P-T), the second coefficient the correlation between errors of place and other type (P-O) and the last coefficient the correlation between errors of time and other type (T-O).

Table 5.12  Pearson correlation coefficient and significance level of percentage of missing adverbial errors of place, time and other (related to the total number of adverbial errors in 50 T-units) in 45 N-children and 60 PI-children

<table>
<thead>
<tr>
<th>Pearson correlation coefficient Missing adverbials of place, time and other</th>
<th>N-children n=45</th>
<th>PI-children n=60</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>value</td>
<td>sign.</td>
</tr>
<tr>
<td>4yrs</td>
<td>P-T</td>
<td>-.278</td>
</tr>
<tr>
<td></td>
<td>P-O</td>
<td>-.201</td>
</tr>
<tr>
<td></td>
<td>T-O</td>
<td>-.166</td>
</tr>
<tr>
<td>6yrs</td>
<td>P-T</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>P-O</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>T-O</td>
<td>-.533*</td>
</tr>
<tr>
<td>8yrs</td>
<td>P-T</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>P-O</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>T-O</td>
<td>-.309</td>
</tr>
<tr>
<td>Total mean</td>
<td>P-T</td>
<td>-.168</td>
</tr>
<tr>
<td></td>
<td>P-O</td>
<td>-.112</td>
</tr>
<tr>
<td></td>
<td>T-O</td>
<td>-.308*</td>
</tr>
</tbody>
</table>

* Correlation is significant at the .05 level (1-tailed).
** Correlation is significant at the .01 level (1-tailed).

Rem: the correlation cannot be computed because at least one of the variables is constant.
In both populations, more in the PI than in the N-children, there is a significant co-occurrence of frequently missing adverbials of time with frequently missing adverbials of other types (N-children: $p<.020$; PI-children: $p<.000$), predominantly in the six-year-old N-children ($p<.020$) and the four and eight-year-old PI-children ($4\text{yrs}: p<.005$; $8\text{yrs}: p<.041$). The eight-year-old N-children seem to have almost overcome the problems in expressing temporal relations and relations of the other type, whereas in the eight-year-old PI-children these problems are not decreasing and there is also a significant co-occurrence of missing adverbials of place and other types ($p<.027$). It seems that PI-children find it difficult to express the correct temporal information and information of manner, state, the degree, etc. Thus, contrary to our expectations, the eight-year-old PI-children have most problems with expressing adverbials, since the co-occurrence of missing adverbial in-formation is the highest in this age group as opposed to the eight-year-old N-children.

### 5.7.3 Conclusion: Missing Adverbials

PI-children show more problems in expressing adverbial information of place, time and other types (manner, state, degree, etc.) in obligatory contexts than N-children: too often PI-children leave adverbial information unexpressed. The results suggest that from age six normally developing children have acquired adverbials of place in the conversational genre, when they have to discuss conversational topics outside the here-and-now. In both populations, adverbial information of time and other types proved to be more difficult to express than adverbial information of place. N-children aged eight seem to have learned to provide spatial information inside the clause frame, although it is not clear whether they can express spatial information between clauses. PI-children seem to be delayed in the acquisition of expressing spatial information inside the clause frame and therefore should also show problems in the use of spatial information between clauses (see 14.3).

### 5.8 General conclusions: the ability to realize lexical categories

There is striking evidence that the ability to fill lexical categories in PI-children contributes substantially to the general ungrammaticality (see 4.2 and 4.3). PI-children show twice as many errors as N-children, but we are talking about small percentages (see Table 5.13). Brown (1973) used the 90% Criterion to define acquisition based on use in obligatory contexts. According to his definition PI-children have often acquired these rules, but they are, nevertheless, performing worse than N-children. In the N-children the amount of errors with respect to missing lexical categories is very low (2% to 4%), but this is doubled in the PI-children (4% to 9%). As deviant behaviour is only a small part of all behaviour, these qualitative differences in deviant morphological/syntactic patterns between PI and N-children cannot be easily observed, but only measured in well-defined morphological/syntactic categories. We used the Explanatory Criterion (Burisch, 1984) that differentiates abnormal behaviour from normal behaviour on the basis of significant group effects (see 3.2.3 and 4.4). These significant differences then are clear indices
The ability to realize lexical categories

for the presence of a different morphological/syntactic development in the area of realizing lexical categories within a T-unit.

PI-children frequently leave obligatory syntactic information, i.e. lexical categories, more often implicit than their age-related peers. The interviews of PI-children contain therefore many minimalized information units that frequently fail to contain one or more structural elements, such as lexical verbs, nouns and pronouns in subject and object position, prepositions and adverbials (Table 5.13).

A subgroup of PI-children had significantly more missing lexical verbs, frequently resulting in verbless T-units. The use of verbless T-units in PI-children indicates that they can give only static descriptions of real life situations, instead of naming actions that are necessary in order to relate successive or simultaneous events into coherent discourse (see also 9.4 and 13.4). Although, contrary to our expectations, the N-children did not express more lexical verbs with age, we observed that the PI-children were significantly worse, indicating that the PI-children genuinely have morphological/syntactic problems in this area (see 4.2 and 4.3).

Table 5.13 An overview of missing lexical categories: missing lexical verbs, ungrammatical missing subjects and objects, missing prepositions and missing adverbials of all types, of place, of time and other types in the specific obligatory context for each category

<table>
<thead>
<tr>
<th>Missing lexical categories</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missing lexical verbs</td>
<td>3%</td>
<td>8%*</td>
</tr>
<tr>
<td>Missing ungrammatical subjects</td>
<td>2%</td>
<td>4%*</td>
</tr>
<tr>
<td>Missing ungrammatical objects</td>
<td>3%</td>
<td>6%*</td>
</tr>
<tr>
<td>Missing prepositions</td>
<td>3%</td>
<td>6%*</td>
</tr>
<tr>
<td>Missing adverbials</td>
<td>4%</td>
<td>9%*</td>
</tr>
<tr>
<td>Place</td>
<td>0.2%</td>
<td>0.6%*</td>
</tr>
<tr>
<td>Time</td>
<td>3.1%</td>
<td>5.5%*</td>
</tr>
<tr>
<td>other types</td>
<td>0.7%</td>
<td>2.9%*</td>
</tr>
</tbody>
</table>

* indicates a significant result

PI-children leave more subjects and objects unexpressed than N-children that cannot be fully explained as discourse topic drop (i.e. grammatical missing arguments). On the one hand, the problems of the PI-children on the level of grammatical form, i.e. realizing argument structure, may be partly related to the problems on the level of pragmatic function, i.e. establishing co-referential relations (see 13.5 to 13.8). On the other hand, since the internal argument, the obligatory object, of a verb is more often missing in post-verbal position in the PI-children compared to the N-children, this suggests that PI-children show a delayed development with regard to obligatory object verbs, as they seem to have a restricted amount of this type of verbs stored in their lexicon. However, although missing structural elements might be related to
language problems in other areas, they are mainly morphological/syntactic in character, since the morphological/syntactic spell-out rules in Dutch seem the core problem in the language acquisition of PI-children. Additional evidence for this idea was found in the fact that in PI-children a strong correlation was observed between the occurrence of ungrammatical missing subjects and objects, reflecting problems with the performance of grammatical rules for argument realization with obligatory transitive verbs. It is important to note that the difficulties in Dutch-speaking PI-children described here are qualitatively equivalent to the morphological/syntactic problems found in Dutch-speaking children with LI (e.g. Schaerlaekens and Goorhuis-Brouwer, 2000) and in children with SLI (e.g. De Jong, 1999; Grela and Leonard, 2000).

When we look outside the core frame of the sentence (verb and its arguments) PI-children show the same problems. They also show difficulties in expressing relational elements, such as prepositions, necessary to connect verbs to their arguments and necessary to connect verbs to adjunct nominals. Finally, when we focus even beyond these structures, PI-children show comparable problems in expressing adverbial information in general, as they showed significantly more unexpressed adverbial relations than the N-children.

To conclude, the interviews of PI-children lack many lexical categories, not only within the core of the T-unit, but also beyond the verb and its arguments. This contributes to ungrammaticality and unintelligibility. With respect to the development in time, we would expect in general that there is a decrease of missing lexical verbs and missing subjects and objects, before we can expect a decrease of missing prepositions and adverbials. However, we only observe a linear decrease with lexical verbs in both populations, although the oldest PI-children resemble the youngest N-children in the number of missing lexical verbs. Related to other lexical categories no clear linear decrease was found in either group of children. Although the PI-children have more missing adverbials than the N-children, we nevertheless have the impression that they fill in lexical gaps with 'light' adverbial phrases, such as 'zo' (this way), 'ook' (also), 'nog' (yet) and 'nog niet' (not just yet), etc.

The analysis of realizing lexical categories does provide evidence for the presence of an uneven profile in PI-children as has often been identified in LI-children (e.g. Leonard, 1996): LI-children may resemble normally developing children two years younger in the use of one element of morphology/syntax, and they may resemble children three years younger in the use of another element.

The morphological/syntactic profile of realizing lexical categories in a subgroup of PI-children differs clearly from those seen in the N-children. In general, PI-children show twice as many errors as the N-children, but in addition, the oldest nine-year-old PI-children resemble the four-year-old N-children in producing missing lexical verbs, missing arguments, prepositions and adverbs. These results, therefore, indicate a delay in using morphological/syntactic rules. Obviously, this has negative implications for the information exchange between the adult and the PI-child in the conversational genre. Lack of specific structural elements in the syntactic frame of the child with psychiatric disorder, often even several elements per clause,
The ability to realize lexical categories contributes to a fragmented and disjointed supply of information during the interview.
6 The ability to realize correct lexical categories: prepositions, adverbials and word order

Annette Scheper

6.1 Introduction
As stated in Chapter 5, PI-children frequently leave lexical categories implicit compared to N-children: they have too many missing lexical verbs, obligatory subjects and direct objects, prepositions and adverbial phrases of place, of time and of other types, especially of manner. There is striking evidence that the restricted ability to fill lexical categories in PI-children contributes substantially to the ungrammaticality described in Chapter 4. The kind of ungrammaticality caused by an error in the realization of a lexical category is the core issue of this chapter. The production of an error has a different impact on the understanding of the message than the occurrence of an empty lexical category (Chapter 5), although we might expect that word order errors have a greater negative impact on intelligibility than, for example, errors in the use of adverbials.

The main goal of this chapter is to examine whether PI-children show a normal ability with respect to the realization of correctly formed lexical categories. With a grammatical error we mean incorrect use of a lexical element in the T-unit. In this chapter we will investigate whether errors with respect to lexical categories exist and how they can be characterized. First, the use of prepositions in prepositional phrases is analysed (6.2). Second, the use of spatial, temporal and other adverbial expressions is investigated (6.3). Finally, the order of words is considered to be related to the placement of nouns, verbs or adjuncts (6.4). Finally, this chapter ends with a general conclusion with regard to errors in lexical categories (6.5).

6.2 Errors in the lexical choice of Prepositions

6.2.1 Research questions, definitions and operationalisations
As stated in 5.6.1, prepositions are essentially relational elements, connecting verbs to the argument or adjunct nominals associated with prepositions within the T-unit (Haegeman, 1991). Prepositional phrases (PP's) provide information as to the place, time or manner of the event expressed in the sentence. In this section we are not interested as to whether errors are made with respect to the realization of place, time and manner (see next section 6.3), but only in semantic errors in the choice of an obligatory preposition within a realized PP, named preposition selection errors. These errors reflect morphological/syntactic impairments, since in Dutch the selection of correct prepositions is strongly restricted by the meaning of the verb. The verb frame that has to be stored in the lexicon additionally contains a specific selection of prepositions. We want to determine whether PI-children produce more preposition selection errors in their interviews than N-children. And, is there a comparable development with age?
In order to determine the rate at which selection errors with prepositions are made, the total number of Prepositional Phrases within 50 T-units are selected with a preposition in first position mostly followed by a nounphrase (Van Zonneveld, 1994; Haeseryn et al., 1997:915). In order to judge the semantically correct use of the preposition, often information of the preceding or next T-unit(s) had to be consulted. In a T-unit more than one prepositional phrase can occur, so more than one prepositional selection error per T-unit is possible. Example 1 shows a preposition error in a PP that marks an adverbial relation of place between an event and the subject.

**Example 1**  Preposition selection error in a PP, which marks an adverbial relation of place between the event 'zitten' (to sit) and the subject in Dutch (PI-child; age 6,5)

**Interviewer:** wat doen ze [de muizen] dan?
what-do-they [mice] then?

**Leander:** en eerst in de avond (eh toe) toen zat mijn muis met dat molentje.

**Paraphrasis:** en s'avonds zat mijn muis <in> dat molentje.
and-in-the-evening-sat-my-mouse<in>-that-little-wheel.

**Leander:** (ging die) sprong die uit de boog [molen].
(went he) jumped-he-out-of-the-wheel.

Example 1 illustrates the choice of the wrong preposition to express the relation of 'zitten' (to sit) with an agent 'mijn muis' (my mouse) in a certain place 'in een molentje' (in a little wheel). The correct preposition is deduced from the following context in which the mouse has to be in the wheel to be able to jump out of the wheel. In the analysis with respect to the preposition selection errors PI-children of four, six and eight year old are compared with N-children in the same age-groups.

### 6.2.2 Results: Preposition Selection Errors

As we have seen in 5.6.2, the numbers of prepositional phrases (PP) in the PI-children was the same compared to the N-children. It was therefore not necessary to use the PPs as covariate in the preposition selection error analysis.

In Table 6.1, the upper part of the Table shows the mean total number of selected PP's used in this analysis, whereas the lower part also shows the number of preposition selection errors within a PP in both groups. The results demonstrate that PI-children show significantly more errors in the correct use of prepositions within a PP than the N-children ($F(1,99)=13.777; p<.000$).

---

1 ANOVA with total number of Realized prepositional phrases as dependent variable and age (4-6-8yrs) as independent variable is used in the N- and PI-children.

2 ANOVA with total number of Preposition errors as dependent variable and age (4-6-8yrs) as independent variable is used in the N- and PI-children. No significant age or group*age interaction effect was observed.
Table 6.1 Mean total number and standard deviation realized prepositional phrases in 50 T-units and mean total number, percentage (related to 50 T-units) and standard deviations of preposition errors in 45 N-children and 60 PI-children in the conversational genre

<table>
<thead>
<tr>
<th>Preposition errors</th>
<th>N-children n=45</th>
<th>PI-children n=60</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>Realized PP's</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>16.06</td>
<td>51</td>
</tr>
<tr>
<td>6 yrs</td>
<td>18.00</td>
<td>38</td>
</tr>
<tr>
<td>8 yrs</td>
<td>18.33</td>
<td>42</td>
</tr>
<tr>
<td>Total mean</td>
<td>17.47</td>
<td>5.46</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Preposition errors</th>
<th>N-children n=45</th>
<th>PI-children n=60</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>4 yrs</td>
<td>0.67</td>
<td>4%</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.93</td>
<td>5%</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.60</td>
<td>3%</td>
</tr>
<tr>
<td>Total mean</td>
<td>1.63</td>
<td>4%</td>
</tr>
</tbody>
</table>

Figure 6.1 shows the development with age in the N- and the PI-children. The number of preposition errors does not substantially decrease from the youngest N- and PI-children to the oldest N- and PI-children: both groups of children show almost comparable paths.

Figure 6.1 Development with age of preposition selection errors (related to mean total number of realized prepositional phrases) in 45 N-children and 60 PI-children in the conversational genre
6.2.3 Conclusion: Preposition Selection Errors

The results confirm a problem in PI-children with the realization of the correct preposition within a realized PP. PI-children do have the ability to realize PP's, but they make significantly more preposition selection errors within these PP's than N-children. The preposition selection errors confirm that the PI-children have difficulties in expressing proper relations between the verbal predicate and the argument or adjunct nominals associated with the preposition. The PI-children not only have problems in realizing prepositions (see 5.6.2), but also in selecting the right one in relation to the verb frame.

6.3 Errors in the lexical choice of Adverbial phrases

6.3.1 Research questions, definitions and operationalisations

The semantic notions space and time are fundamental categories of orientation in the world, as we emphasized in 5.7, and can be morphologically/syntactically expressed (e.g. Hickmann, 2003). From the early age of two years children use adverbials in Dutch (Bol and Kuiken, 1988). Around the age of three children can combine two adverbials in a single clause in addition to the verb and its arguments (Verhulst-Schlöchting, 1987). Children first have to learn to provide spatial and temporal information inside the clause frame before they can use more integrated spatial and temporal information between clauses.

Initially, normally developing children make overextension errors in the production of adverbials, especially in the adverbials of place and time (Schaerlaekens and Gillis, 1987). Overextension means that children go beyond the boundaries of a concept and therefore overextend the meaning of it. For example, young children first use the adverbial 'gisteren' (yesterday) universally for referring to any time moment except the real time 'nu' (now). Gradually, children have to learn the correct semantic use of different type of adverbials (Gillis and Schaerlaekens, 2000). From the developmental literature, we know that Dutch-speaking four-year-olds can use only few obligatory adverbials, mostly of the type of place and sometimes of the type of time. It is assumed that when children become able to express more complex meanings, they have to diversify their use of obligatory adverbials (Gillis and De Houwer, 1998).

We want to examine whether PI-children make more form errors in adverbials or adverbial phrases of place, time or other types compared to their age-matched N-children. We also want to determine whether the P and the N-children show a comparable development with age. In order to determine the rate at which adverbial errors that contribute to ungrammaticality occurred, four different types of adverbial errors were counted, also specified according to the type of adverbials or adverbial phrases that was erroneously used, such as place, time or other types (manner, degree, negation etc.) (Haeseryn et al., 1997:905; see also 5.7).
The ability to realize correct lexical categories

The four different types of adverbial errors that cause ungrammaticality are shown in Table 6.2.

Table 6.2 Different types of adverbial errors

<table>
<thead>
<tr>
<th>Types of adverbial errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) adverbials that contradict each other in meaning</td>
</tr>
<tr>
<td>(2) redundant adverbials within one type</td>
</tr>
<tr>
<td>(3) erroneous word selection in adverbial phrase</td>
</tr>
<tr>
<td>(4) semantically conflicting selection error of the adverbial of time related to the correct tense expressed by the verbal predicate (e.g. 'toen gaat hij weg' (then he goes away))</td>
</tr>
</tbody>
</table>

Only error type (4) occurs exclusively in adverbials of time, whereas error type (1) to (3) may occur in the three different adverbial types, such as of place, time and other. Each type of error will be explained in more detail below, illustrated by some examples. However, simple examples were difficult to find, as often these types of adverbial errors – that were also identified based on intonation cues – do not occur independently, but mostly within a cluster of language errors, not only related to semantic/pragmatic difficulties, but also to other morphological/syntactic problems.

First, the use of two adverbial phrases of the same type (time, place or other) that contradict each other semantically within the same T-unit were coded as an adverbial error, so that the T-unit was judged as ungrammatical in Dutch (Example 2 and 3).

Example 2 Contradicting adverbials of time (PI-child; age 6;0)

Richard: en nu strakjes dat het avond is, dan gaan wij naar de tuin.
          (and now in a moment when the evening comes, we will go to the garden)
Paraphrasis: en <> strakjes <als> het avond is, dan gaan wij naar de tuin.
           (and <> in a moment when the evening comes we will go to the garden)

In Example 2, 'nu' (now) and 'strakjes' (in a moment) are conflicting adverbials of time with respect to the starting point of the event the child wants to express. This makes the T-unit ungrammatical.

Example 3 Contradicting adverbials of degree (PI-child; age 8;3)

Jeffrey: dus dat was een beetje heel zielig.
        so that was a little bit very sad.
Paraphrasis: dus dat was <> heel zielig.
In Example 3, the adverbials 'een beetje' (a little bit) and 'heel' (very) are contradictory. Although this example also shows a problem of evaluating the proper degree of an event, the conflicting semantic information not only negatively influences the understanding of the listener, but also makes the T-unit not well-formed in Dutch.

Second, the use of two redundant adverbial phrases of one type (time, place or other) in the same T-unit were coded as an adverbial error, causing that the T-unit can be judged as ill-formed in Dutch (Example 4).

Example 4  Redundant adverbials of place (PI-child; age 6:5)

Interviewer:  oh en wat doet ze [moeder] dan met de kom [vissenkom]?
Mere1:  nou die gaat ze wassen.
well-that-goes-she-washing.
(Merel:  #1 en dan (eh) doet ze der ander water in en der weer takjes er in doen, waar ze van
and-then-does-she-der different-water-in-and-der again-twigs-derin-done-
ook kunnen eten.
which-they-also-can-eat.
(I and then she puts different water in and again twigs in which they also can eat).

Paraphrasis:  en dan doet ze daar ander water << en << weer takjes << in <<, waar ze << ook>
and-then-does-she-again different-water-<< and-<< again-twigs-in<< which-they-
<van> kunnen eten.
also-can-eat.
(I and then she again puts << different water << and << again twigs << in which
they also can eat).

Example 4 shows too many, redundant adverbials of place 'der,.in' (there,.in) and 'der,.erin' (there,.therein): when two successively expressed adverbials have the same meaning, the last one is redundant. The place is already clear from the main clause, so the explicit markers of the place in the reduced clause is a burden of information that not only confuses the listener, but also causes the T-unit to be ill-formed.

Third, erroneous word selection in adverbial phrase of one type (time, place or other) was coded as an adverbial error, causing the T-unit to be judged ungrammatical in Dutch (Example 5).
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Example 5  Erroneous word selection in adverbial of time (PI-child; age 6;3)

Robert:  juffrouw krijg een baby voor (eh) een ander keer.
         teacher-get-a-baby for (eh) another time.
Paraphrasis:  de juffrouw krijgt een baby <over een tijdje>.
              the teacher will have a baby in a while.

In Example 5, the combination of the preposition, the adjective and the noun in the
adverbial phrase of time is not only semantically inappropriate, but – more
importantly here – is grammatically incorrect, since 'een ander keer' (for another
time) should have been 'een andere keer'.

Fourth, a selection error in the adverbial of time as related to the tense expressed by
the verbal predicate was coded as an adverbial error, causing that T-unit to be
judged as ungrammatical (Example 6).

Example 6  Semantically conflicting selection error of adverbial of time (PI-child; age 6;5)

Leander:  en dan gingen alle hare omhoog staan.
         and-now went-all hair-in-the-air.
Paraphrasis:  en <toen> gingen alle hare omhoog staan.
             and <then> went-all hair-in-the-air.

In Example 6, the adverbial of time 'dan' (then; present tense) is incorrectly used
(instead of the adverbial 'toen' (then; past tense)) in combination with the correctly
used past tense of the verbal predicate 'gingen' (went).

6.3.2 Results: Adverbial Errors

From Table 6.3, we see that the PI-children make significantly more adverbial errors
than the N-children (F(1,99)=3.934; p<.050). However, also a significant
group*age interaction effect is found (F(2,99)=5.167; p<.007), indicating that the
developmental change with age is different in the P-group compared to the N-group.
The significant interaction effect motivates a post-hoc analysis using one-way
ANOVA.

---

4 The use of the past tense was judged as correct, since the preceding and following T-units all were
expressed in the past tense.
5 ANOVA with total number of Adverbial errors as dependent variable and age (4-6-8yrs) as
independent variable is used in the N- and PI-children.
6 A one-way ANOVA/ANCOVA is used to examine the linearity of the age effects in both groups. A
linear age effect indicates the influence of development.
Table 6.3  
Mean total number, percentage (related to 50 T-units) and standard deviation adverbial errors in general in 45 N-children and 60 PI-children in the conversational genre

<table>
<thead>
<tr>
<th>Adverbial errors</th>
<th>N-children n=45</th>
<th>PI-children n=60</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>4 yrs</td>
<td>0.93</td>
<td>4%</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.53</td>
<td>1%</td>
</tr>
<tr>
<td>8 yrs</td>
<td>1.33</td>
<td>3%</td>
</tr>
<tr>
<td><strong>Total mean</strong></td>
<td>1.27</td>
<td>3%</td>
</tr>
</tbody>
</table>

From Figure 6.2, it is clear that in both populations - unexpectedly - no linear age-developments with regard to adverbial errors were found, but quadratic developments reflecting a turned U-curve in the N-children and a U-curve in the PI-children.

Figure 6.2  
Development with age of the production of adverbial errors (related to 50 T-units) in 45 N-children and 60 PI-children in the conversational genre

These results are mainly caused by the eight-year-old N-children that unexpectedly behave relatively worse than the six-year-old N-children, whereas the four-year-old PI-children make relatively few adverbial errors, mainly due to the relatively low production of adverbials compared to the same aged N-children. Thus, the chance to find errors is relatively reduced in the four-year-old PI-children.

When we differentiate between the adverbial errors related to different types of adverbials, Table 6.4 shows that in both populations comparably adverbials of other

---

7 One-way ANOVA with total number of Adverbial errors as dependent variable and age (4-6-8yrs) as independent variable is used in the N-children. One-way ANOVA with total number of Adverbial errors as dependent variable and age (4-6-8yrs) as independent variable is used in the PI-children.
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Types are the most difficult to use morphologically/syntactically appropriately, followed by adverbials of time and place.

Although PI-children produced as many adverbial errors of place as the N-children, the PI-children produced significantly more adverbial errors of other types (F(1,98)=6.647; p<.011) than the N-children. Surprisingly, the PI-children showed significantly fewer problems with the correct use of adverbials of time than the N-children (F(1,98)=3.626; p<.030). However, the PI-children use very few different adverbials of time and they do not show the ability to vary the use of certain forms.

Table 6.4  Mean total number, percentage (related to the total number of adverbial errors in general) and standard deviation of adverbial errors of place, time and of other types in 45 N-children and 60 PI-children in the conversational genre

<table>
<thead>
<tr>
<th>Different types</th>
<th>N-children n=45</th>
<th>PI-children n=60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adverbial errors of place</td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>4yrs</td>
<td>0.00</td>
<td>0%</td>
</tr>
<tr>
<td>6yrs</td>
<td>0.00</td>
<td>0%</td>
</tr>
<tr>
<td>8yrs</td>
<td>0.13</td>
<td>10%</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.04</td>
<td>3%</td>
</tr>
<tr>
<td>Adverbial errors of time</td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>4yrs</td>
<td>0.93</td>
<td>48%</td>
</tr>
<tr>
<td>6yrs</td>
<td>0.13</td>
<td>25%</td>
</tr>
<tr>
<td>8yrs</td>
<td>0.67</td>
<td>50%</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.58</td>
<td>41%</td>
</tr>
<tr>
<td>Adverbial errors of other types</td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>4yrs</td>
<td>1.00</td>
<td>52%</td>
</tr>
<tr>
<td>6yrs</td>
<td>0.40</td>
<td>75%</td>
</tr>
<tr>
<td>8yrs</td>
<td>0.53</td>
<td>40%</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.64</td>
<td>56%</td>
</tr>
</tbody>
</table>

From Figure 6.3, we see that adverbial errors of time linear decrease in the P-population (F(2.98)=3.626; p<.030; Eta squared .06; R squared .05) in contrast to

---

8 ANCOVA with adverbial errors of place as dependent variable, total number of adverbial errors as covariate and age (4-6-8yrs) as independent variable is used in the N- and PI-children. The total number of adverbial errors differs significantly in both populations, so this variable is used as covariate. The group*age interaction effect is insignificant.

9 ANCOVA with adverbial errors of other types as dependent variable, total number of adverbial errors as covariate and age (4-6-8yrs) as independent variable is used in the N- and PI-children. The group*age interaction effect is insignificant.

10 ANCOVA with adverbial errors of time as dependent variable, total number of adverbial errors as covariate and age (4-6-8yrs) as independent variable is used in the N- and PI-children. There is an insignificant group*age interaction effect.

11 One-way ANOVA with Adverbial errors of time as dependent variable, total number of Adverbial errors as covariate and age (4-6-8yrs) as independent variable is used in the PI-children.
the N-population. In order to explain this result, we use the same argument as above: N-children seem to be experimenting more with different forms of adverbials of time and make therefore more errors in comparison with PI-children who have a less differentiated use of temporal expressions.

**Figure 6.3** *Development with age of adverbial errors of time (related to the total number of adverbial errors in general) in 45 N-children and 60 PI-children in the conversational genre.*

From Figure 6.4, we see that, unexpectedly, PI-children show a linear increase with age of adverbial errors of other types ($F(2,98)=3.515; p<.034$; Eta squared .13; $R^2$ .02)\(^{12}\) in contrast to the N-children who improve after six years of age. Since we are interested in clusters of morphological/syntactic errors (see 4.3), we checked whether adverbial errors of place co-occurred with adverbial errors of time and of other types, etc. We observed that in the PI-children adverbial errors of time significantly co-occur with adverbial errors of other types ($r=-.277; p<.016$)\(^{13}\) comparable to the N-children ($r=-.283; p<.030$)\(^{14}\) (see Appendix 6a). These results suggest that there seems to be a developmental order: adverbials of time seem to be acquired before adverbials of other types, since errors in adverbials of time seem to predict adverbial errors of other types.

---

12 One-way ANOVA with Adverbial errors of other types as dependent variable, total number of Adverbial errors as covariate and age (4-6-8yrs) as independent variable is used in the N-children. Oneway ANOVA with Adverbial errors of other type as dependent variable, total number of Adverbial errors as covariate and age (4-6-8yrs) as independent variable is used in the PI-children.

13 Pearson's product-moment-correlation (pmc) coefficient is used with variables percentage errors of place, time and other type (related to the total number of adverbial errors) in the interview of 50 T-units in 60 PI-children of four, six and eight-year-old. Correlation is significant at the .05 level (1-tailed).

14 Pearson's pmc coefficient is used with variables percentage errors of place, time and other type (related to the total number of adverbial errors) in an interview of 50 T-units in 45 N-children of four, six and eight year old. Correlation is significant at the .05 level (1-tailed).
6.3.3 Conclusion: Adverbial Errors

Overall, the PI-children as a group produce significantly more adverbial errors than N-children, contributing to the ungrammaticality (see 4.2 and 4.3). PI-children produce more redundant adverbial phrases that have the same semantic content; these influence the intelligibility of informational exchange in the interview negatively. As a consequence, using too many adverbial phrases indicates focussing on optional information, rather than focussing on the kernel of the sentence, that is the verbal predicate and its arguments.

Since the development with age with respect to the production of adverbials errors show rather diverse patterns, we might assume that there is great individual variation within the N- and the PI-children due to a relatively high degree of optionality of adverbial phrases.

However, a limited adverbial lexicon in the PI-children decreases the chance to observe adverbial errors. This may be an explanation for the non-linear age effects observed. Nevertheless, the results showed that adverbials of place are the least problematic, whereas adverbial errors of time often co-occur with adverbial errors of another type in the PI-children comparably to the N-children. These results suggest a developmental order of complexity, although it still is an issue of future research whether Dutch-speaking children acquire the correct use of adverbials of place before the correct use of adverbials of time and adverbials of other types.
6.4 Errors in Word Order

6.4.1 Research questions, definitions and operationalisations
Word order in a language is closely related to the typological properties of that language. Languages are classified according to a basic word order with the most important constituents of a sentence, namely the Subject (S), the Verb (V) and the Object (O). Linguistic theories describe word order as the result of movement of these lexical categories to their functional positions. For example, the position determines the morphological/syntactic function of a lexical category. It is also a standard observation in the acquisitional literature, that in languages where word order is fairly fixed, children rapidly use this word order with very few errors. This was first noticed by Brown (1973) and by many other researchers since. For languages where word order is more flexible, there are differing reports. Children can first systematically use non-dominant SOV order before switching to the proper SVO order and vice versa (e.g. Slobin, 1982; Mills, 1985; Hickey, 1990). Undoubtedly, it seems that there is variation cross-linguistically.

Dutch constituent order in main clauses is quite variable. Constituent order is linked to the type of clause (main versus subordinate clause), mood (declarative versus interrogative) and topicalization processes (De Houwer and Gillis, 1998). Declarative main clauses in Dutch exhibit SVO word order and declarative subordinate clauses have SOV order. From the perspective of generative grammar, the latter is seen as the underlying order, meaning that for Dutch the verb phrase is in final position (Koster, 1975). In subordinate clauses, the constituent order is less variable than in main clauses: the relative order of Subject, Object and Verb is nearly always the same, namely SOV. In main clauses the finite verb occurs in second position, as Dutch is a Verb Second language (Haegeman, 1991). The subject is often in first position, although topicalization of a constituent such as an object or an adverbial replaces the subject after the finite verb, i.e. subject-verb inversion (see this chapter). The place of the object is the most variable of the three: in first position, after the inverted subject or after the finite verb (Koster, 1975). Adjuncts, like adverbial phrases, are structure-neutral constituents that can be placed variably in first position or after the finite verb or object (Van Zonneveld, 1994) (6.3).

In early two-word sentences, primary grammatical relations are already ordered in an adult-like way, such as subject-predicate or head-complement, although their morphological realization is still underspecified. The expression of these grammatical relations through word order mostly precedes the development of marking specific morphological distinctions between grammatical relations (Van Kampen and Wijnen, 2000). During the early stages of acquisition the verb in infinitival form is in final position. Children have to learn that the verb must move into the second position of the sentence and be finite. At this point in the acquisition order problems can appear in verb second languages (Haegeman, 1991). The period during which children seem to freely alternate finite and non-finite lexical verbs is called the 'Optional Infinitive' (OI) stage (Poeppel and Wexler, 1993; Wexler, 1994). The finite and non-finite verbs appear with a different word order: sentence-second position and sentence-final, respectively. Wexler claims that in this stage tense is
The ability to realize correct lexical categories

underspecified. In Dutch, for example, this period may last until approximately the age of 3:6 (Wijnen and Bol, 1993). SLI-children will need more time to escape from the OI stage and even have an 'Extended Optional Infinitive' (EOI) stage that is characterized by the predominance of verb forms that are not feature-marked (Rice, Wexler and Cleave, 1995). During this stage SLI-children do not regard the marking of finiteness on the verb as obligatory and show significantly more difficulties in establishing proper word order than their normally developing same-aged peers. Even after the acquisition of the placement of the finite verb, children with SLI still show word order errors independent of incorrect verb morphology (Leonard, 2002). Thus, normally developing Dutch children have to acquire the proper rules for the order of the constituents in their specific language. In this section, therefore, we want to examine whether the PI-children show more word order errors compared to the age-matched N-children and whether there is a comparable development with age.

We define word order errors as any problem with the word order pattern of a T-unit, concerning mostly nouns, verbs or adverbials, following STAP (Van den Dungen and Verbeek, 1994:46, 1999; Haeseryn et al., 1997:1225). Although an error of this kind often results in changing the position of more than one constituent in a T-unit, this is counted as a single word order error per T-unit. Word order errors concern mostly difficulties related to specific inversion rules, for example in topicalized T-units, but also concern difficulties related to the verb-second rule. It is not quite clear at what point in development Dutch-speaking children start to use fronted constituents in sentence-first position in clauses that clearly contain a finite verb and a subject (Wijnen and Verrips, 1998). By the time children are three years old, they seem to be using a fair number of clauses with a subject and a finite verb in which there is a fronted constituent (e.g. Verhulst-Schlichting, 1985; De Houwer, 1990). Since Dutch is a verb-second language, the fronted element should be followed by a verbal element in second position. If an object or an adverbial is topicalized, these main clauses usually show appropriate adult-like inversion, in which the subject is moved to post verbal position. In this type of topicalization the same movement can be observed as in question inversion, namely postverbal movement of the subject. Although question inversion, both yes/no questions and WH questions where the interrogative pronoun is not the subject, seems to be acquired by the age of three years (e.g. Haegeman, 1991), other types of inversion seem to be still in development. Thus, in the development of Dutch word order in N-children, we might expect word order errors (Example 7) and even more so in the PI-children.

Example 7  Subject-verb inversion error (PI-child; age 4:5)

<table>
<thead>
<tr>
<th>Bas:</th>
<th>Paraphrasis:</th>
</tr>
</thead>
<tbody>
<tr>
<td>dan we doen</td>
<td>dan &lt;gaan we&gt;</td>
</tr>
<tr>
<td>verstoppertje spelen.</td>
<td>then-go-&lt;we&gt;</td>
</tr>
<tr>
<td>then we are hiding.</td>
<td>then we play hide-and-seek</td>
</tr>
</tbody>
</table>
Example 7 shows an error in the word order in the form of a non-inverted subject. If a fronted element, like the adverbial of time 'dan' (then; present tense) is used in sentence-first position, consequently the second position of a sentence must be filled with a verbal element (Haegeman, 1991) and the subject 'we' (we) should have been moved to postverbal position.

Example 8 shows the incorrect placement of an auxiliary verb that should be in second position.

**Example 8**

Verbal order error: no verb second (PI-child; age 4.8). Topic of the conversation is staying with Marco's grandfather and grandmother.

**Interviewer:**

Marco:

Paraphrasis:

Verbal order error: no verb second (PI-child; age 4.8). Topic of the conversation is staying with Marco's grandfather and grandmother.

In Example 8, the coordinate conjunction 'maar' (but) connects a T-unit with the previous one (see also 13.3). So the conjunction is not part of the syntactic scope of the T-unit. In this example, the conjunction 'maar' (but) is followed by a subject in first position, but the expected finite verbal element in second position is not realized. The auxiliary 'ga' (go) is placed in prefinal position, which implies an error in word order for Dutch.

Another example of a wrong placement of verbal elements, although not related to verb-second, is shown in Example 9.

**Example 9**

Verbal order error (PI-child; age 4.2)

Gary:

Paraphrasis:

In Example 9, the two verbal parts 'maken' (to make) and 'gaan' (to go) are in wrong sentence position and should be reversed.

Finally, the placement of adverbials can be wrong, like in Example 10.
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Example 10  Adverbial order error (PI-child; age 4.5)
Bas: nou heb ik een nieuwe \textit{vanavond} gekregen.
now-have-I-a-new-one \textit{this evening}-got.
Paraphrasis: nou heb ik <\textit{vanavond}> een nieuwe <-> gekregen.
now-have-I-\textit{this evening}-a-new-one-<->-got.
(now I got a new one this evening)

In Example 10, the adverbial of time 'vanavond' (tonight) is placed in the right position of the object instead of in the left position. These examples show typical word order errors in Dutch, although other types exist. Nevertheless, all different types of word order errors found in the data are included in our analysis. Contrary to the analysis of preposition and adverbial errors where we compared 60 PI-children with 45 N-children (Roelofs, 1998), with respect to the analysis of word order errors we compare 120 PI-children of all ages with 240 N-children from the STAP-population (Van den Dungen and Verbeek, 1994, 1999).

6.4.2 Results: Word Order Errors
First, from Table 6.5 we see that a significantly high number of PI-children (p<.000)\textsuperscript{15} represent the marked category with a z-score equal or below minus 2 (first column), producing too many word order errors, as 62% of the PI-children show severe and 12% shows slight problems with word order. Overall, 74% of the PI-children show a real problem with word order.

<table>
<thead>
<tr>
<th>Word order errors</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal distribution</td>
<td>z \leq -2</td>
</tr>
<tr>
<td>4 yrs</td>
<td>16</td>
</tr>
<tr>
<td>5 yrs</td>
<td>11</td>
</tr>
<tr>
<td>6 yrs</td>
<td>14</td>
</tr>
<tr>
<td>7 yrs</td>
<td>9</td>
</tr>
<tr>
<td>8 yrs</td>
<td>13</td>
</tr>
<tr>
<td>9 yrs</td>
<td>11</td>
</tr>
<tr>
<td>Total children%</td>
<td>74</td>
</tr>
</tbody>
</table>

\textsuperscript{15} Binomial test was used in PI-children to measure the differentiation in severe problems (z \leq -2 and z > -2) and slight problems (z \leq -1 and z > -1) on the variable Word order error according to the STAP-values (Van den Dungen and Verbeek, 1994, 1999).
Second, from Table 6.6, we see that there is no clear age development in the number of word order errors in the PI-children\(^{16}\) comparable to the N-children.

\[\text{Table 6.6} \quad \text{Mean total number, percentage (related to 50 T-units) and standard deviations of word order errors in 240 N-children (STAP, 1994) and 120 PI-children in the conversational genre}\]

<table>
<thead>
<tr>
<th>Word order errors</th>
<th>N-children (n=240)</th>
<th>PI-children (n=120)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(x)</td>
<td>(%)</td>
</tr>
<tr>
<td>4 yrs</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>6 yrs</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>8 yrs</td>
<td>1*</td>
<td>2%</td>
</tr>
<tr>
<td>9 yrs</td>
<td>1*</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Total mean</strong></td>
<td>1</td>
<td>2%</td>
</tr>
</tbody>
</table>

*values extracted by extrapolation

Although it is suggested that the youngest N-children seem to have overcome the real problems with order of constituents in the syntactic frame, the PI-children seem to have problems with word order even in the oldest age groups (Figure 6.5).

A more detailed study of the order problems showed that 25\% of the order errors in PI-children were subject-verb inversion errors (see Example 7). Despite a fronted element, like an adverbial, the subject was not moved into postverbal position, but stayed in second position. These subject-verb inversion errors lead to ungrammaticality of the T-unit (see 4.2 and 6.4.1).

\[\text{Figure 6.5} \quad \text{Development with age of word order errors (related to 50 T-units) in 240 N-children and 120 PI-children in the conversational genre}\]

\[\text{ANOVA with word order error as dependent variable and age (4-5-6-7-8-9yrs) as independent variable is used in the PI-children.}\]
6.4.3 Conclusion: Word Order Errors

It is obvious from the results that the PI-children show significantly more problems with the order of constituents in a sentence than the N-children. Problems with word order are closely related to the typological properties of a language, especially verb second languages like Dutch (Haegeman, 1991). In Dutch SLI-children word order problems were not found (De Jong, 1999) as opposed to Swedish SLI (e.g. Hansson and Nettelbladt, 1995; Hansson and Nettelbladt, 2001). These Swedish SLI-children often maintain the subject-verb order in an obligatory context for inversion. Similar problems are found in the PI-children: they show too many order problems, especially with subject-verb inversion. Dutch PI-children differ from Dutch SLI-children relating to order problems. Thus, the fact that 74% of all the PI-children deviate significant from the norm, indicates that word order errors are one of the key problems that contribute to the ungrammaticality we already observed (see 4.2 and 4.3).

6.5 General conclusions: the ability to realize correct lexical categories

It is obvious from the results that PI-children show significantly more problems with the realization of the semantically correct lexical categories of all the different types measured than the N-children, resulting in morphologically/syntactically incorrect T-units (4.2). The PI-children not only make significant preposition selection errors and adverbial errors, but also significantly more word order errors (Table 6.7).

<table>
<thead>
<tr>
<th>Errors lexical categories</th>
<th>N-children n=45/240</th>
<th>PI-children n=60/120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preposition selection errors</td>
<td>4%</td>
<td>10%</td>
</tr>
<tr>
<td>Adverbial errors</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>Place</td>
<td>0.1%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Time</td>
<td>1.2%</td>
<td>0.8%</td>
</tr>
<tr>
<td>other types</td>
<td>1.7%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Word order errors</td>
<td>2%</td>
<td>6%</td>
</tr>
</tbody>
</table>

These results indicate problems in the PI-children with expressing the proper semantic relations by means of a preposition between the predicate and the argument or adjunct nominals associated with prepositions within the T-unit. Similarly, they also have difficulties in producing correct expression of adverbials of manner, degree, negation, etc. that have a negative impact on the ability to explicate detailed information about actions and events (see 12.5).
Finally, the results suggest that word order errors are typical for PI-children compared to N-children, as opposed to Dutch SLI-children (De Jong, 1999), since threequarters of all 120 PI-children have problems in this area, reflecting greater difficulties in acquiring hierarchical grammatical relations even in the oldest age groups. These PI-children often seem to be incapable to escape from the preference for sequential grammatical relations.

To conclude, the analysis of errors in lexical categories confirms the presence of an uneven profile in PI-children (e.g. Leonard, 1996): the oldest nine-year-old PI-children resemble the youngest four-year-old N-children in making more errors in the selection of prepositions, adverbials and in word order. A subgroup of PI-children shows twice as many preposition selection and word order errors as the N-children, although we have not observed this for the adverbial errors (see Table 6.6). Overall, PI-children show a delay in using grammatical rules for the realization of lexical categories compared to the N-children.
7 The ability to realize functional categories: tense and agreement marking

Annette Scheper

7.1 Introduction

Children have to acquire lexical and functional categories to be able to construct the grammar of their specific language. A generative framework identifies lexical categories, such as VP (Verb phrase), NP (Noun phrase), AP (Adjective phrase) and PP (Prepositional phrase). These lexical categories are subordinate to so-called functional categories, such as INFL (Inflection), DET (Determiner), COMP (Complementizer) and NEG (Negation) that determine the syntactic phrasal structure (e.g. Chomsky, 1986, 1992) (Table 7.1). Functional categories are crucially involved in morphological/syntactic processes such as movements of verbs, tense marking by inflectional morphology and agreement relations (subject-verb and determiner-noun). Some of these processes are prominent in Dutch grammar, and these will form the anchor points for the morphological/syntactic analysis in this chapter (Table 7.1).

Table 7.1 Functional categories (INFL, DET, COMP, NEG) that dominate lexical categories (VP, NP, AP, PP)

<table>
<thead>
<tr>
<th>Functional categories</th>
<th>Morphological/syntactic analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFL (Inflection):</td>
<td></td>
</tr>
<tr>
<td>Tense:</td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td></td>
</tr>
<tr>
<td>Past</td>
<td></td>
</tr>
<tr>
<td>Future</td>
<td></td>
</tr>
<tr>
<td>Agreement:</td>
<td></td>
</tr>
<tr>
<td>Subject-Verb agreement</td>
<td>Simple past tense marking (7.2)</td>
</tr>
<tr>
<td>Object-Verb agreement</td>
<td></td>
</tr>
<tr>
<td>DET (Determiner):</td>
<td></td>
</tr>
<tr>
<td>(1) The number and gender agreement between:</td>
<td>Number and gender agreement (7.4)</td>
</tr>
<tr>
<td>Det (Determiner) and noun</td>
<td></td>
</tr>
<tr>
<td>Num (Numeral) and noun</td>
<td></td>
</tr>
<tr>
<td>A (Adjective) and noun</td>
<td></td>
</tr>
<tr>
<td>(2) The agreement between quantifier and noun phrase and genitive case-marking</td>
<td></td>
</tr>
<tr>
<td>COMP (Complementizer)</td>
<td>Coordinating conjunctions</td>
</tr>
<tr>
<td>Coordinating conjunctions</td>
<td>Coordinating conjunctions in conjunction reduction constructions (8.4)</td>
</tr>
<tr>
<td>Subordinating conjunctions</td>
<td>Subordinating conjunctions in embedded clauses (8.5)</td>
</tr>
<tr>
<td>NEG (Negation)</td>
<td>Not analysed</td>
</tr>
</tbody>
</table>
Chapter 7 Morphological/Syntactic conversational development

Functional categories are associated with grammatical bound morphemes such as tense markers and agreement markers between subject-verb and determiner-noun. The marking of finiteness by tense and agreement serves to anchor events in time and has an impact on word order in that verbs surface in different syntactic positions depending on whether or not they are finite (see also 6.4). In Dutch also specific grammatical free morphemes occur, such as coordinate and subordinate conjunctions. These conjunctions are relational elements between clauses that serve a functional purpose in inter-clause or intra-clause connectivity (see 8.5).

As was pointed out in Chapter 6, the results show that PI-children have too many errors in the selection of a semantically correct preposition in comparison to N-children. Selection errors of adverbial expressions other than place or time adverbs are prominent in PI-children. PI-children also have too many errors in the word order of their utterances, especially in sentences with a topicalized element that needs inversion of the subject and the verb. To summarize, PI-children show problems in expressing lexical categories correctly and in the correct placement of these categories (see 6.2 to 6.4).

The main goal of this chapter is to examine whether PI-children show problems in expressing specific functional categories and whether problems in this domain of functional projections significantly contributes to the problems we found in the grammatical form in general (see 4.2 and 4.3).

The first specific morphosyntactic feature to be discussed is the use of simple past tense (7.2). We want to determine to what extent the ability of marking simple past tense is comparable in both groups of children. Secondly, the ability to express morphosyntactic feature agreement in PI-children compared to N-children will be discussed. Agreement relations are divided into agreement between the subject and the verb (7.3) and agreement between the determiner and the noun (7.4). Finally, we will make some concluding remarks about the ability to realize functional categories (7.5).

7.2 Marking Errors in Simple Past Tense

7.2.1 Research questions, definitions and operationalisations

All languages provide speakers with various means of marking temporal/aspectual distinctions when representing and organizing situations (events, states) in cohesive discourse. Tense relates the time of the situation referred to to some other time, usually the moment of speaking (Comrie, 1985:2). The commonest tenses found in languages – though not all languages distinguish these three tenses, or indeed distinguish tense at all – are present, past, and future. A situation described in the present tense is located temporally as simultaneous with the moment of speaking (e.g. 'Harmen zingt' (Harmen is singing)); one described in the past as located prior

1 A handbook for the analysis of tense and agreement has been developed (Scheper, 1996).
to the moment of speaking (e.g. 'Harmen zong' (Harmen sang or Harmen was singing)); one described in the future as located after the moment of speaking (e.g. 'Harmen zal zingen' (Harmen will be singing)).

The marking of tense on the verb stem involves the mapping of a semantic notion (time) to a grammatical notion (tense) (Comrie, 1985). In Dutch, tense morphemes are inflectional and must attach to a verbal stem. Since almost all sentences refer to a certain point in time, a sentence without a finite verb form is almost always ungrammatical. As Dutch is a verb-second language, children have to learn to use the finite (i.e. marked for tense) verb form in second position in a main clause (Wijnen and Bol, 1993; Wijnen, 1998).

In Table 7.2, the inflectional paradigm for present, simple past and past perfect tense marking in Dutch is presented (Gillis and De Houwer, 1998:29-32).

Table 7.2 The inflectional paradigm for the present, simple past and past perfect tense marking in Dutch

<table>
<thead>
<tr>
<th>Tense marking</th>
<th>Singular</th>
<th>Plural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First person</td>
<td>stem ∈                     stem + /u/ (stem in case of inversion)</td>
<td>stem + /en/</td>
</tr>
<tr>
<td>Second person</td>
<td>stem + /u/</td>
<td>stem + /en/</td>
</tr>
<tr>
<td>Third person</td>
<td>stem + /u/</td>
<td>stem + /en/</td>
</tr>
<tr>
<td>Regular simple past</td>
<td>stem + /den/ or /te/</td>
<td>stem + /den/ or /ten/</td>
</tr>
<tr>
<td>Irregular simple past</td>
<td>change stem vowel (and consonant change or addition)</td>
<td>singular form + /en/</td>
</tr>
<tr>
<td>Regular past perfect</td>
<td>Auxiliary + /had/was</td>
<td>Past participle /ge/+stem+ /u/</td>
</tr>
<tr>
<td>All persons</td>
<td></td>
<td>Auxiliary + /hadden /waren</td>
</tr>
<tr>
<td>Irregular past perfect</td>
<td>Auxiliary + /had/was</td>
<td>Past participle /ge/+vowel change + /en/</td>
</tr>
<tr>
<td>All persons</td>
<td></td>
<td>Auxiliary + /hadden /waren</td>
</tr>
</tbody>
</table>

* Both forms are the most common past participle forms (for other forms see Gillis and De Houwer, 1998:29-32)

In Dutch, the present tense verb form inflects for three persons (first, second and third person) and two numbers (singular, plural). The infinitive form is identical to the plural present tense form. The simple past tense forms do not express person, but only number (singular, plural) in both regular and irregular verb forms. The selection of the regular simple past tense affix is determined by the final segment of the verb stem: - te(n) is the marker of past tense in case of a stem that ends with an unvoiced
final consonant; if the stem ends in a vowel or a voiced final consonant, then the marker is \(-de(n)\). The past perfect tense goes either with the temporal auxiliaries 'hebben' (to have) or 'zijn' (to be). The past participle formation in the past perfect depends on the verb type. Regular verbs add the suffix /\(v\) to the stem, whereas irregular verbs have a systematic stem vowel change.

The analysis of past tense formation offers the opportunity to investigate how abstract linguistic rules are learned and inferred by the child. Language acquisition research has therefore frequently focused on the production of past tense forms in children, since in the application of rules for these forms problems with verbal inflectional morphology can be detected. Different language acquisition theories explain the acquisition of past tense. First, the 'Defective Tense hypothesis' or 'Aspect-before-Tense hypothesis' (Antinucci and Miller, 1976) states that (past) tense marking is determined by cognitive development: children are not able to express remote temporal reference before they can abstract from their own personal viewpoint, that is before they develop a theory of mind (2.3.3). It is claimed that past tense marking is first used to mark aspect and not a temporal relation, since children have not acquired a representation of the past. Behrens (1993) found, however, that young German-speaking children can refer to the past (outside-the-here-and-now) by means of infinite verbs, nouns and adverbials before the use of past tense on verbs.

Second, the 'Semantic Pacesetting hypothesis' (Slobin, 1985) states that children show a semantic predisposition to relate past tense forms firstly to a result (resultatitivity) or an intrinsic endpoint (telicity), which provide a starting point for the acquisition of tense markers. Telic verbs connect the event in the past and the end result in the present by the result of the action. Even adults use more telic past tense forms than atelic (Shirai and Andersen, 1995; Aksu-Koç, 1998). Although young German-speaking children showed a strong preference for past tense marking of telic verbs that encoded change of state, past tense marking was also applied to telic verbs that encode events without change of state or remote past events (Behrens, 1993). Similarly, Rozendaal (2001) found past tense forms in both telic and atelic constructions in Dutch-speaking children (aged 2;2 to 3;2 year), although telic past tense forms were more frequently observed than atelic forms.

Third, the 'Formal Pacesetting hypothesis' (Bowerman, 1985) postulates that young children reveal a degree of input sensitivity not only with respect to the formal markers of tense and aspect that have to be acquired, but also with respect to the semantic notions of tense and aspect they encode. The early use of activity verbs with past tense markers confirms that children are aware of the form-function patterns in the target language without going through a semantically determined phase first (Behrens, 1993).

Finally, according to the 'Optional Infinitive hypothesis' (Poeppel and Wexler, 1993; Wexler, 1994) there is an optional infinitive stage in language acquisition in which finite and non-finite constructions co-occur without morphological or semantic motivation. The emergence of the tense feature, which is represented in past tense, indicates the end of this stage (see also 7.3).
Acquisition of past tense forms (simple and perfective) in Dutch is related to the semantic category of the verb. Normally developing Dutch-speaking children initially produce past tense forms on telic verbs that are verbs with an intrinsic endpoint, such as 'maken' (to make) (Rozendaal, 2001). This early preference is not found for verbs with non-past tense marking. Later on, past-tense-marking of verbs that refer to a state or activity appear, such as 'zien' (to see).

Normally developing Dutch-speaking children first produce a complex predicate that is an auxiliary with a main verb, instead of non-finite matrix verbs, before they acquire past tense forms (De Houwer, 1987; Wijnen and Bol, 1993). The early past tense forms (perfective) consist of specific auxiliaries, such as the verb forms 'gaan' (to go) and 'zijn' (to be) combined with a lexical verb, whereas later simple past tense forms of lexical verbs appear, such as 'ging' (went), 'lag' (lay down), 'zat' (sat), 'had' (had), 'zei' (said) and ' deed' (did). The use of a past participle in young Dutch-speaking children may be a form denoting past tense, although it seems more likely that it has the aspectual meaning of completedness (Jordens, 1990).

A well-known phenomenon in the acquisition of past tense is that young Dutch-speaking children overgeneralize the simple past tense suffix of regular verbs '-de/-te' (equivalent of -ed in English) in irregular verbs to produce errors like 'hij liepte' (irregular form plus -ed, like he droved instead of he drove). Children also underspecify the irregular verb forms, like 'hij zwemte' (he swimmed) instead of 'hij zwom' (he swam). Later on, children use the correct and incorrect past tense forms parallel to each other; this is called a fade-in phenomenon (Van Kampen and Wijnen, 2000:252). Overgeneralization shows that children are acquiring a system of rules; errors result from the inappropriate application of these rules. Overgeneralization errors cannot be explained in terms of imitation, but are the child's own creation (Plunkett et al, 1997). Interestingly, overgeneralization errors often occur after children have succeeded in producing the correct past tense for (ir)regular forms and therefore show a U-shaped learning profile. An explanation posited by connectionists (see 2.3.2) postulates that children start off learning irregular past tense and plural forms through rote memory without awareness of the linguistic rule; then they discover the suffixation-rule and finally apply this rule to irregular forms previously learned by rote. This approach identifies the source of the children's errors as the result of a transition of rote learning to symbolic rule-governed learning (Rumelhart and McClelland, 1986). Another approach postulates that irregular forms differ in representational strength and therefore exhibit variability in their reliability of retrieval from memory (Pinker and Prince, 1988).

What is more, Grammatical SLI-children mark past tense in obligatory contexts less often than their peers or younger children with a comparable language age (Leonard, Bortolini, Caselli, McGregor and Sabbadini, 1992; Bishop, 1994; Rice, Wexler, Marquis and Hershberger, 2000). In line with these results Dutch research has shown that SLI-children in the age range of 6 to 9 years old produced fewer regular simple past tense forms than either of the control groups and omitted simple past tense inflections more often (De Jong, 1999). Additionally, children with Grammatical SLI make more errors in the inflection of simple past tense that are not always less complex than the correct form, but are specified as 'near-miss' errors (Leonard,
In sum, the area of past tense marking is therefore an area where we might expect the PI-children to perform less well than the N-children. To examine whether PI-children show problems in marking of simple past tense in obligatory contexts, we want to explore whether PI-children make more errors in simple past tense marking compared to N-children in the conversational genre.

And, is there a comparable development with age?

Here, we want to gain insight in the different error types of past tense form and therefore we analysed specific categories (see Table 7.3). Finally, we want to examine whether PI-children show problems with the continuation of the past tense over T-units, so in a narrative context. Therefore, we want to answer the following questions: do PI-children make more overgeneralizations and omissions of simple past tense forms in a single T-unit or between T-units than N-children in the interview? And, is there a comparable development with age?

In Dutch a variety of past tense errors are possible; these will contribute to the ungrammaticality of the sentence. The analysis under investigation focuses on general error patterns of simple past tense marking and error categories used in research in grammatical SLI-children (e.g. De Jong, 1999). We restrict our analysis of past tense marking to the use of the simple past tense in order to be able to compare our results with the 'norms' available from the STAP-population (Van den Dungen and Verbeek, 1994, 1999) and to compare our results to the results found by De Jong (1999) in children with SLI. We identified the total number of T-units with an obligatory context for simple past tense in order to determine the rate at which past tense errors occurred. First, the T-unit must have a verbal element in an inflected, stem or infinitival form. Errors with regard to simple past tense marking can be divided in either wrong inflectional marker for simple past tense (Category 1) or omission of simple past tense marker with a possibly present tense form as substitution within a T-unit (Category 2) and between T-units (Category 3) (see Table 7.3). With regard to 'overgeneralizations' (Category 1 errors) the PI-children are compared with the N-children from the Roelofs-population (1998) and from the STAP-population (Van den Dungen and Verbeek, 1994, 1999). With respect to the other categories we compare the PI-children only with the N-children from the Roelofs-population, since no data are available from the N-children from the STAP-population.
The ability to realize functional categories: tense and agreement marking

Table 7.3 Different types of errors in simple past tense marking in Dutch used in the analysis

<table>
<thead>
<tr>
<th>Simple past tense errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1</td>
</tr>
<tr>
<td>Category 2</td>
</tr>
<tr>
<td>Category 3</td>
</tr>
</tbody>
</table>

Simple past tense error of Category 1 is defined as a wrong inflectional marker for past tense, the so-called overgeneralization: the regular verb forms (stem + /te(n)/, /de(n)/) are overgeneralized to irregular past tense forms (Example 1).

**Example 1** Simple past tense error of Category 1: overgeneralization (PI-child; age 8;2)

Brenda:  
nou, als we roepen +" Lassie, kom, dan kwam die gelijk.  
well-if-we-shouted:"Lassie, come"-then-came-she-immediately.

Paraphrasis:  
nou, als we <riepen> +" Lassie, kom, dan kwam die gelijk.  
well-if-we-shouted:"Lassie, come"-then-came-she-immediately.

In Example 1, in Dutch the verb 'roepen' (to shout) is an irregular verb and needs a vowel change to mark past tense. The inflectional marker of a regular verb form '-ten' (-ed) is used incorrectly with the verb in the example.

The other two types of errors are related to the continuation of past tense: when children start a T-unit in the past tense, they should continue in the past tense. Thus, in Dutch there exists an obligatory context for past tense marking. Simple past tense error of Category 2 is defined as an omission of a past tense marker in an obligatory context for past tense within a single T-unit.

The obligatory context for the use of past tense is, for example, triggered by the occurrence of an adverbial phrase indicating past, such as 'gisteren' (yesterday), 'een tijd geleden' (a time ago) or 'toen' (then; referring to past only) (Example 2).

**Example 2** Simple past tense error of Category 2: omission of past tense marker with the occurrence of a past adverbial within a single T-unit (PI-child; age 4;11)

Rick:  
en toen val ik zo (me) met me kop op de grond.  
and-then-fall-I-just-(wi)-with-my-head-on-the-ground.

And then I fall just (wi) with my head on the ground.)
Paraphrasis: en toen viel ik zo (me) met me kop op de grond.
and-then-fell-I-just-(wi)-with-my-head-on-the-ground
(and then I fell just (wi) with my head on the ground)

In Example 2, the past adverb ‘toen’ (then; referring to past only) needs a simple past tense, but the PI-child has used a present tense form instead. If a main clause is in the simple past tense, the dependent clause should maintain this value for tense and vice versa. A tense-shift within a T-unit is also coded as an error of the Category 2 type. Whenever there existed incongruence between a main clause in the simple past tense and a subordinated clause in the present tense, this was coded as an error of Category 2 (Example 3).

Example 3  Simple past tense error of Category 2: incongruence between main clause in past tense and subordinated clause in present tense within a single T-unit (PI-child; age 4.8)

Jeroen:
#1 was niet omdat ik zelf wil.
#1 was-not-because-I-myself-want.
(#1 was not because I myself want)
Paraphrasis: 
#1 was niet omdat ik <dat> zelf <wilde>.
#1 was-not-because-I <it>-myself <wanted>.
(#1 that was not because I myself wanted <it>)

In Example 3, the tense of the subordinated clause should correspond to that of the main clause; in this case a past tense form is omitted in the dependent clause.

In Dutch, the third type of error is also related to the continuation of past tense: when children start a T-unit in the past tense that belongs to extended discourse, they should continue in the past tense. Thus, in Dutch there exists an obligatory context for past tense marking in a narrative (see 9.3) and in extended discourse with a narrative character in the conversational genre (see also 11.5).

Simple past tense error of Category 3 is defined as a shift of the past tense to the present tense between T-units in a so-called obligatory narrative context in the conversational genre. The shift of the past to the present tense in such an obligatory context for past tense is marked, resulting in ungrammaticality (Example 4).

Example 4  Simple past tense error of Category 3: omission of past tense in obligatory narrative context between T-units (PI-child; age 4.11)

Rick:
#2 en ik had (hele) zo grote stok gevonden.
#2 and-I had (whole) such-a large-stick found.
(#2 and I had (whole) such a large stick found)
Rick: 
# zo grote tot op de grond.
(# so long it reached to the ground)
Rick::<>
maar kom niemand te slaan tegen.
but-come-nobody-to-hit-against.
(but find nobody to hit)
Paraphrasis: maar <ik> <kwam> niemand <tegen> <om> te slaan <>,
but <I> <came> nobody-against-to-hit.
(but <I> nobody to hit)
In Example 4, the PI-child situates the narrative in the past and starts with a past tense form. Within this narrative, the child shifts the past tense into the present one with the verb 'kom' (come). This tense-shift is not appropriate; because of the narrative context the whole event has to be situated in the past.

7.2.2 Results: Marking Errors in Simple Past Tense

It is clear that PI-children make significantly more errors of all types in marking past tense than N-children ($F(1,98) = 4.965; p<.028$) (Table 7.4) calculated over all T-units with a verbal element in an inflected, stem or infinitival form.

Table 7.4 Mean total number, mean percentage (related to obligatory contexts for past tense) and standard deviation of simple past tense errors of all types in general in 45 N-children and 60 PI-children

<table>
<thead>
<tr>
<th>simple past tense errors of all types</th>
<th>N-children n=45</th>
<th>PI-children n=60</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>Obligatory context</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total mean</td>
<td>48.6</td>
<td>-</td>
</tr>
<tr>
<td>4 yrs</td>
<td>0.27</td>
<td>1.0%</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.20</td>
<td>0.5%</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.01</td>
<td>0.0%</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.16</td>
<td>0.50%</td>
</tr>
</tbody>
</table>

Figure 7.1 shows the development with age in making past tense errors in both groups of children. Obviously, both PI and N-children show no significantly linear decrease with age. We see, as expected, that school-aged N-children make relatively few errors in the conversational genre with simple past tense marking, decreasing to zero in the eight-year-old N-children. This result confirms the finding that suggests that the development in marking simple past tense in Dutch takes place between the ages of two to eight years, as is observed in the STAP (Van den Dungen and Verbeek, 1994, 1999).

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2 ANCOVA with Past tense errors in general as dependent variable, total number of T-units with an obligatory contexts for past tense marking as covariate and group (N-PI) and age (4-6-8yrs) as independent variables. Main effect for age and group*age interaction was not significant.
When we compare the PI-children to the N-children from the STAP-population (Table 7.5), we see that only 1% of the PI-children show severe problems and none of the children show slight problems with regard to the production of overgeneralizations. If the PI-children differed as a group from these N-children, the percentages should be higher than 2.3%, since in a population with a normal distribution 2.3% can be expected to score below 2sd and 16% below 1sd (see 4.1). Thus, the PI-population represents a normal distribution with respect to the overgeneralized forms of simple past tense.

Table 7.5 Distribution of total number and percentage of 60 PI-children in the age of four, six and eight years categorised according to z-scores \( z \leq -2 \), \(-2 < z \leq -1 \) and \( z > -1 \) on the overgeneralized simple past tense forms (Error of Category 1) in the conversational genre

<table>
<thead>
<tr>
<th>PI-children N=60</th>
<th>Error of Category 1 Overgeneralized simple past tense forms</th>
</tr>
</thead>
<tbody>
<tr>
<td>( z \leq -2 )</td>
<td>( -2 &lt; z \leq -1 )</td>
</tr>
<tr>
<td>( 2,3% )</td>
<td>( 16% )</td>
</tr>
<tr>
<td>4yrs 0 0% 0 0% 20 100%</td>
<td></td>
</tr>
<tr>
<td>6yrs 1 2% 0 0% 19 98%</td>
<td></td>
</tr>
<tr>
<td>8yrs 1 2% 0 0% 19 98%</td>
<td></td>
</tr>
<tr>
<td>Total PI-children% 2 1% 0 0% 58 99%</td>
<td></td>
</tr>
</tbody>
</table>

It seems that the PI-children do not use past tense forms very frequently in the conversational genre. Possibly, conversational topics of daily life events with a durative character and (near) future might have triggered more present/perfect/future
tense than past tense forms (Parigger and Baker, 2002). This does not mean that past tense obligatory contexts were completely absent in the conversational data of the PI and N-children. In Dutch, a marked preference exists for the perfect tense above the simple past tense in the relating of past events. We found that if PI-children produce past tense forms, they frequently use the auxiliary 'ging(en)' combined with a main predicate to express the past (see also 9.3), a so-called 'light' version of the past tense (according to De Jong, 1999). De Jong (1999:61) states that: “it merely carries the tense marker, but it has no semantic load that adds to the main predicate”. The PI-children might use these 'light' past tense forms as a strategy to avoid more morphologically complex forms of past tense.

In Table 7.6, we present the omission of simple past tense forms within a single T-unit (Category 2) or between T-units (Category 3) in the PI-children and the N-children from the Roelofs-population (1998).

<table>
<thead>
<tr>
<th>Omission of simple past tense</th>
<th>N-children n=45</th>
<th>PI-children n=60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 2: single T-unit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>0.00 0.0% 0.00</td>
<td>0.35 0.9% 0.59</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.13 0.3% 0.36</td>
<td>0.20 0.5% 0.41</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.00 0.0% 0.00</td>
<td>0.00 0.0% 0.00</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.04 0.1% 0.12</td>
<td>0.18 0.37% 0.33</td>
</tr>
<tr>
<td>Category 3: between T-units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>0.20 0.5% 0.41</td>
<td>0.40 1.1% 0.94</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.00 0.0% 0.00</td>
<td>0.65 1.7% 1.42</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.00 0.0% 0.00</td>
<td>0.40 1.1% 0.60</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.07 0.17% 0.14</td>
<td>0.48 1.3% 0.99</td>
</tr>
</tbody>
</table>

PI-children do not show significantly more omitted simple past tense forms within a single T-unit (Category 2) compared to the N-children. Obviously, PI-children do not show severe problems with the choice of the proper tense in these contexts. However, the PI-children have significantly more omitted simple past tense forms

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4 ANCOVA with Past tense errors within a single T-unit as dependent variable, total number of obligatory contexts for past tense marking as covariate and group (N-PI) and age (4-6-8yrs) as independent variables. Main effect for age, group and group*age interaction was not significant.
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between T-units (Category 3) than the N-children\(^5\). PI-children often violate continuation of the simple past tense form that is motivated by the obligatory context in extended discourse with a narrative character. They show problems in temporally organizing their narratives within the conversational genre (see also 9.3).

7.2.3 Conclusion: Marking Errors in Simple Past Tense

Surprisingly, PI-children show no problems with the inflectional morphology in simple past tense forms (Category 1) in the interviews. This could be due to the type of genre that concentrates on daily life topics that trigger present/perfect/future tense forms in both groups of children. Apparently, PI-children also show no severe problems with the choice of the proper tense in a T-unit with a past adverbial (Category 2) or a tense-shift between a main and a subordinate clause within a T-unit (Category 2). This seems to be different from Dutch grammatical SLI-children (De Jong, 1999) who show problems with holding on to the proper tense within a T-unit. However, this might be due to the different eliciting strategies of language data: we collected spontaneous language in a conversational interview, whereas De Jong (1999) elicited past tense forms in an experimental setting.

The only significant difference is that the PI-children significantly more frequently use the present tense form instead of the past tense form between T-units (Category 3). They shift the time-line between T-units from present to past and vice versa too frequently with regard to the obligatory context (see also 9.3). These problems with shifting tense incorrectly in extended discourse with a narrative character in PI-children could be related to problems in the area of semantics/pragmatics, particularly the use of language-specific cohesive devices (see 13.5 to 13.7). The results of marking past tense in the PI-children do not justify a claim that there is a principled absence of grammatical rules or of features that underlie them, just as is found by De Jong (1999) who also did not find evidence for the absence of grammatical rules for marking past tense in Dutch-speaking SLI-children.

7.3 Errors in Subject-Verb Agreement

7.3.1 Research questions, definitions and operationalisations

In section 7.2, we showed that the PI-children have no problems with inflectional morphology to mark simple past tense, only in realizing past tense in narrative extended discourse. In this section, we will explore the second part of functional category INFL, namely the 'agreement' between the subject and the verb (see Table 7.1).

As the child's verbal repertoire comes to include multi-word sentences, a system is emerging that organizes words into structured and meaningful strings. During this acquisition stage, starting at age two, children omit 'grammatical morphemes' (e.g.

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\(^5\) ANCOVA with Past tense errors between T-units as dependent variable, total number of obligatory contexts for past tense marking as covariate and group (N-PI) and age (4-6-8yrs) as independent variables. Main effect for age and group*age interaction was not significant.
The ability to realize functional categories: tense and agreement marking

Brown, 1973; Bowerman, 1973), such as tense and agreement markers and determiners. During this stage no lexical categories are really missing and they are already fixed in a language-specific order, but particular functional features have not yet been added to specific syntactic categories. The absence of particular morphemes in itself is not sufficient to conclude that children do not possess the necessary representations. Within the generative framework in syntactic theory, called Principles & Parameters Theory (see 2.3.2), these grammatical morphemes are associated with the 'heads' of functional categories. A separate node INFL dominates the tense feature of the verb, but also its agreement properties (Haegeman, 1991, 1994). In English the inflectional properties of verb conjugation are minimal, but Dutch has richer paradigms of conjugation: verb morphology has the grammatical function of expressing an agreement relation with the grammatical subject that is marking person and number values of the subject (Haegeman, 1991; Van Zonneveld, 1994).

As we mentioned earlier, functional categories are crucially involved in syntactic processes such as movement of verbs. In Dutch there are two positions for verbs: the first is the sentence-final position to the right of the verb's realized object and seen as the basic position; the second one is the 'verb-second' position that has to be preceded by at most one other constituent (Koster, 1975) (see 5.3 and 5.4). Verb second is restricted to finite verbs in independent clauses. A difficult issue is the distinction between finiteness and tense. Finite equals tense-marking, but finiteness does not always imply proper marking for agreement features in Dutch. For example in third person singular of regular verb forms, the use of the stem verb form instead of an infinitival is considered finite, but agreement marking is missing, such as in ‘*hij loop’ (stem form)’ (he walk).

Dutch data from developmental research show that agreement is learned stepwise. As soon as word combinations occur in Dutch child language from age two, utterances with an infinitive verb form in final position occur. The infinitive verb form is often seen as the earliest verb form in Dutch child language.

Children's development of verb phrase morphology shows a great deal of interindividual variation, to the extent that some children may start out using bare stems rather than what has been viewed as infinitives. In early syntax in the combinations of a (pro)nominal and a verb, the verb usually takes the final position. The function of the initial nominal phrase can be both agentive (subject) and passive (object) (Verhulst-Schlichting, 1996; Bol, 1995; Wijnen 1995). The next stage is marked by appearance of constructions with a single verb occurring in first or second position (Verhulst-Schlichting, 1985; Bol and Kuiken, 1988; Bol, 1995). Then, clauses can be marked by the appearance of complex predicates. In these constructions, one verb has finite morphology, and occurs in first or second position and the other, with nonfinite morphology, occurs in sentence-final position. The sentence-final verb can either be an infinitive or a past participle. Most Dutch-speaking children studied are producing complex predicates at the age of two and a half-year old, when they are well into the multi-word stage. Three or four months after the appearance of complex predicates the proportion of non-finite constructions decreases (Jordens, 1990;
Wijnen, 1995). Another three or four months later, the percentage of non-finite sentences of all sentences will typically have dropped to five (Wijnen, 1995). At this time Dutch children show a distinct tendency to construct finite sentences with the aid of auxiliaries such as *doe(t) 'do(es)' and *ga(at) 'go(es)'*, rather than by conjugating and moving the lexical verb (Jordens, 1990; Evers and Van Kampen, 1995; Hollebrandse and Roeper, 1996). In many of these cases, the auxiliaries appear to be 'dummy' forms (or 'expletives'), since they do not contribute to the meaning of the utterance or add an unjustified aspectual feature.

To summarize, there is a stage in which typically developing Dutch children fail to mark verbs for agreement (and tense): the Optional Infinitive (OI) stage (Poeppeal and Wexler, 1993; Wexler, 1994). As stated in 7.2, the OI stage is the period during which children seem to alternate finite and non-finite lexical verbs freely, another example of a fade-in phenomenon in morphological/syntactic development (Van Kampen and Wijnen, 2000) (see 7.2). This period may last until the age of 3;6 approximately (Wijnen and Bol, 1993). Wijnen (1998) suggests the following steps in the development of verb morphology (tense and agreement) and placement (see also De Jong, 1999:97), as is shown in Table 7.7.

Table 7.7 Development of verb morphology (tense and agreement) and placement (Wijnen, 1998; see also De Jong, 1999:97)

<table>
<thead>
<tr>
<th>Development tense and agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Verb in infinitival form is in sentence-final position</td>
</tr>
<tr>
<td>2 Occurrence of verb in second position (Verb Second)</td>
</tr>
<tr>
<td>3 Optional use in second position of either a lexical verb form or a modal auxiliary followed by</td>
</tr>
<tr>
<td>an infinitival lexical verb in final position</td>
</tr>
<tr>
<td>4 Build-up of an agreement paradigm for the lexical verb</td>
</tr>
<tr>
<td>5 Splitting of the paradigm (person and number) for the lexical verb</td>
</tr>
</tbody>
</table>

SLI-children appear to need more time to escape from the OI stage and have even an Extended Optional Infinitive (EOI) stage (Rice, Wexler and Cleave, 1995): during this stage they do not regard the marking of finiteness on the verb as obligatory (see 6.4.1). Some Dutch-speaking SLI-children in the age of 6;0 to 9;0 years were still in the EOI stage (De Jong, 1999).

The main questions here are whether PI-children produce more subject-verb agreement errors compared to N-children and if they do, which type of agreement errors are made in comparison to N-children. And, is there a comparable development with age?
As said before, children seem to learn agreement stepwise (Leemans, 1994; Wijnen, 1998; De Jong, 1999). Tense (any form of finiteness) is learned before agreement. In normally developing children tense correlates with the acquisition of verb second (Wijnen and Bol, 1993; Wijnen, 1998). In Dutch the existence of finiteness does not imply a correct marking for agreement (De Jong, 1999). To determine which type of agreement errors PI-children make compared to N-children the acquisition order of agreement in normal development is followed.

To determine the rate at which subject-verb agreement errors occur, the total number of T-units with an obligatory context for agreement are used (Haeseryn et al., 1997:1139). First, the T-unit must contain a verbal element in an inflected or infinitival form. Second, the T-unit must have a realized subject. If the subject was not realized, but could be inferred from the situation or the linguistic context, the T-unit was also included in the analysis of agreement. In Dutch a variety of agreement errors is possible (Table 7.8). The analysis under investigation pinpoints to general error patterns of agreement found in the data and error categories used in research in language-impaired children (e.g. De Jong, 1999). In order to compare the results of agreement marking in PI-children also with SLI-children Error Categories 1 and 3 are used according to De Jong (1999:68-69).

Table 7.8 Agreement errors used in the morphological/syntactic analysis

<table>
<thead>
<tr>
<th>Agreement errors</th>
<th>Type of errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1</td>
<td>an empty second position (no verb second) and an infinitive verb form in final position</td>
</tr>
<tr>
<td>Category 2</td>
<td>an empty second position (no verb second) and a past participle in final position</td>
</tr>
<tr>
<td>Category 3</td>
<td>lack of an inflectional agreement marker with a stem form (infinitive minus -en) of the verb in second position</td>
</tr>
<tr>
<td>Category 4</td>
<td>wrong agreement between subject and verb with an incorrect person/number marking of the verbal element in second position</td>
</tr>
</tbody>
</table>
An agreement error of Category 1 from Table 7.7 involves T-units with an empty second position (no verb second) and a non-finite verb form in final position, i.e. an infinitive form (Example 5). This category indicates that verb second is not yet acquired\(^6\). The infinitive verb form is the citation form of the verb. It expresses only the lexical verb meaning but has no additional temporal-aspectual meaning, such as participles (Haeseryn et al., 1997:451). In Dutch the infinitive is constructed by adding \(-\text{en}\) to the verb stem as opposed to English, which has no affix for the infinitive form.

**Example 5**  
**Agreement error of Category 1: an empty second position and infinitive in final position in Dutch (PI-child; age 8;11)**

Miranda:  
dat waren onze lievelingsdieren.  
that-were-our-favourite-animals.  
(Those were our favourite animals)

Miranda: \(\rightarrow\)  
wij \(<\rightarrow\) zo kijken [naar de pony's].  
we-<->-so-to-look [at the ponies].  
(We look [at the ponies])

Paraphrasis:  
wij \(<\text{gingen}\>\) zo kijken [naar de pony's].  
we-<started>-so-to-look [at the ponies].  
(We started to look [at the ponies])

Example 5 can be interpreted as if the auxiliary verb is not expressed in second position. The consequence of this interpretation is that the T-unit is not marked for agreement and tense.

An agreement error of Category 2 consists of an empty second position (no verb second) and again a non-finite verb form in final position, but in this case a past participle (Example 6). Non-finite forms of this type combine a finite auxiliary and/or modal verb with a past participle to constitute the sentence predicate. Past participles characterize the process or activity as a completed state at any given time (Haeseryn et al., 1997:67). Past participles occur within finite complex tenses or in adjectival usage. An unrealized auxiliary in second position with a realized past participle (Category 2 error) could also indicate problems with acquiring a complex predicate, since these auxiliaries not only mark for tense and agreement, but can also carry aspectual features (Gillis and De Houwer, 1998).

---

\(^6\) Category 1 'an empty second position (no verb second) and an infinitive verb form in final position' is analysed according to the definitions used by De Jong (1999:69). Category 1 in the analysis of PI-children is identical to Category 3 in the analysis of SLI-children carried out by De Jong (1999).
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Example 6  
Agreement error of Category 2: unrealized auxiliary in verb second position and a past participle in final position in Dutch (PI-child; age 4;2)

Willem:

en Thijmen <-> al jarig geweest.
and-Thijmen-<--->-already-birthday-been.
(and Thijmen <had>already his birthday)

Paraphrasis:  
en Thijmen is al jarig geweest.
and-Thijmen-is-already-birthday-been.
(and Thijmen <had>already his birthday)

In Example 6, the second position is not filled with the auxiliary 'is' ('is') despite the realized past particle as part of the complex verb phrase in clause-final position.

An agreement error of Category 3 involves lack of an inflectional agreement marker, resulting in a T-unit with a stem form (infinitive minus -en) of the verb in second position⁷. The verb position and finiteness are closely related in the acquisition of Dutch, so occurrences of the stem form of the verb are considered finite. The infinitival verb form typically occurs in sentence final position and the finite verb in second or fronted position, like in yes-no questions (Example 7).

Example 7  
Agreement error of Category 3: no agreement marker with a stem form of the verb in second position in Dutch (PI-child; age 4;11)

Rick:

dan ga we (eh) stokken zo breken.
then-go-we-(eh)-sticks-so-to-break.
(then we go to break sticks)

Paraphrasis:  
dan gaan we zo stokken breken.
then-go-we--sticks-so-to-break.
(then we go to break sticks)

In Example 7, there is no agreement marker between the plural subject 'we' (we) and the stem form 'ga' (go). Only agreement errors of Category 3 are identified in an obligatory context for second and third person singular (Dutch: stem + /i/) or for plural inflection (Dutch: stem + /en/); these agreement errors could not be identified for first person singular (Dutch: stem + /ò/), since this agreement marking is not distinguishable from the stem form in Dutch.

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⁷ Category 2 'verbs in second position without an inflectional marker' is analysed according the definitions used by De Jong (1999) and agrees with Category 1 in the analysis of agreement of SLI-children (De Jong, 1999:68).
Finally, the most obvious and clear error of agreement is an agreement error of Category 4: wrong agreement between subject and verb with an incorrect number marking of the verbal element in second position (Example 8).

**Example 8**  
*Agreement error of Category 4: agreement error for person and number in Dutch (PI-child: age 4;5)*

(yes, but Mirjam and we think that they cannot be caught)

Paraphrase: ja, maar Mirjam en wij *denken*, dat je ze niet kon vangen.

In Example 8, there is no correct agreement between the plural subject 'Mirjam en wij' (Mirjam and we) and the singular verb form 'denkt' (think); the plural inflectional marker -en is missing.

Table 7.9 shows an overview of the four Error Categories classified according to the acquisition order of agreement in normal development in Dutch in a matrix, partly following De Jong (1999:70).

**Table 7.9**  
*Error Categories for subject-verb agreement relations*

<table>
<thead>
<tr>
<th>Error Category 1</th>
<th>Error Category 2</th>
<th>Error Category 3</th>
<th>Error Category 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person</td>
<td>Number</td>
<td>Finiteness</td>
<td>Tense</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>+</td>
<td>+</td>
<td>+</td>
<td>?</td>
</tr>
<tr>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

* means error in subject-verb agreement

In Table 7.9, the first two error categories (marked with a /*/ for the type of error on different levels) have a topic in first position and an empty second position (marked as -/-) with either an infinitive (error Category 1) or a past participle in sentence-final position (error Category 2). The last two error categories have a realized verbal element in second position (marked with +/-), but the inflectional marker is either missing (error Category 3) or not missing, but wrong (error Category 4). Error Category 1 and 2 concern non-finite verb forms, lacking auxiliaries, as opposed to Category 3 and 4 that concern finite verb forms. All the different categories of

---

8 Error Category 1 'inappropriate value number for person and number between the subject and the verb' agrees with Error Category 2 in the agreement analysis of SLI-children by De Jong (1999:68).
missing or wrong verb morphology influence the grammaticality of the T-unit negatively, as defined in 4.2 and 4.3.

7.3.2 Results: Subject-Verb Agreement Errors

As explained in 7.3.1, agreement errors are counted in T-units with an obligatory context for agreement, where no verbal element and subject are missing. First, Table 7.10 shows the proportion of T-units with an obligatory context for agreement calculated over all T-units (50). Second, the proportion of T-units with an agreement error calculated over all these T-units that contain such an obligatory context is presented.

Since we know that in interviews with PI-children a significantly higher number of missing lexical verbs (see 5.2) and missing subjects (see 5.3) are observed, we expect that the PI-children produce fewer obligatory contexts for subject-verb agreement than the N-children. This is indeed the case (F(2,99)=15.454; p<.000).

Table 7.10 Mean total number, mean percentage and standard deviation of obligatory contexts for subject-verb agreement and subject-verb agreement errors in 45 N-children and 60 PI-children

<table>
<thead>
<tr>
<th>Subject-verb agreement errors</th>
<th>N-children n=45</th>
<th>PI-children n=60</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>Obligatory contexts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4yrs</td>
<td>39.67</td>
<td>4.59</td>
</tr>
<tr>
<td>6yrs</td>
<td>41.87</td>
<td>3.44</td>
</tr>
<tr>
<td>8yrs</td>
<td>41.07</td>
<td>2.22</td>
</tr>
<tr>
<td>Total mean</td>
<td>40.87</td>
<td>3.59</td>
</tr>
<tr>
<td>Agreement errors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>0.87</td>
<td>2.1%</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.80</td>
<td>1.9%</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.20</td>
<td>0.5%</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.62</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

The PI-children show significantly more errors in marking subject-verb agreement than N-children9 (F(1,98)=7.179; p<.009). In Figure 7.2 the development with age

---

9 ANOVA with Obligatory contexts for subject-verb agreement as dependent variable and group (N-PI) and age (4-6-8yrs) as independent variables. Main effects for age and group*age interaction were not significant.

10 ANCOVA with Subject-verb agreement errors as dependent variable, total number of obligatory contexts for subject-verb agreement as covariate and group (N-PI) and age (4-6-8yrs) as independent variables. Main effect for group*age interaction was not significant.
is presented for the PI-children in all age groups, although the statistical analysis includes only the four, six and eight year olds of both populations, since no data of the five, seven and nine-year-old N-children was available (see 4.3.1). Also a main effect for age is found in both groups (F(2,98)=5.558; p<.005), which motivates a post hoc analysis. Surprisingly, the development with age shows only linearity in the PI-children (p<.000; R squared .17; Eta squared .21)\textsuperscript{11} as opposed to the non-linear decrease found in the N-children\textsuperscript{12}.

Figure 7.2 Development with age of percentage subject-verb agreement errors (related to obligatory contexts for subject-verb agreement) in 45 N-children and 120 PI-children

The results confirm that by age four in normally developing children the subject-verb agreement paradigm is acquired, since 98% of all instances are realized correctly, increasing to correct agreement in 99%/100% at age eight. Table 7.11 shows the different error types of subject-verb agreement.

\textsuperscript{11} One-way ANCOVA with Subject-verb agreement errors as dependent variable, total number of obligatory contexts for subject-verb agreement as covariate and age (4-6-8yrs) as independent variable in N-children.

\textsuperscript{12} One-way ANCOVA with Subject-verb agreement errors as dependent variable, total number of obligatory contexts for subject-verb agreement as covariate and age (4-6-8yrs) as independent variable in N-children.
The ability to realize functional categories: tense and agreement marking

Table 7.11

<table>
<thead>
<tr>
<th>Subject-verb agreement errors</th>
<th>N-children, n=45</th>
<th>PI-children, n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1</td>
<td>x 0.02 % 3 % sd 0.15</td>
<td>x 0.10 % 5 % sd 0.18</td>
</tr>
<tr>
<td>Category 2</td>
<td>x 0.00 % 0 % sd 0.00</td>
<td>x 0.05 % 4 % sd 0.31</td>
</tr>
<tr>
<td>Category 3</td>
<td>x 0.01 % 2 % sd 0.15</td>
<td>x 0.01 % 1 % sd 0.13</td>
</tr>
<tr>
<td>Category 4</td>
<td>x 0.59 % 95 % sd 0.87</td>
<td>x 1.56 % 90 % sd 1.48</td>
</tr>
</tbody>
</table>

Of the different types of errors in subject-verb agreement an incorrect marking for person and number (Category 4) was the most frequent error type in both groups. The PI-children have significantly more marking errors for person and number (Category 4) than the N-children \( F(1,100)=4.098; p<.046 \)\(^{13}\).

Earlier results indicated that the PI-children make more word order errors, especially with the expression of topicalized constituents (objects or adverbs) that need a subject-verb inverted word order (verb-subject order) in Dutch (see 6.4). A closer look at the data showed that indeed half of the total number of incorrect marking for person and number in the interviews with the PI-children were contexts with an inverted word order between the subject and the verb. However, no significant group effect was found for the amount of agreement errors in these contexts \(^{14}\), but only a significantly linear age effect in the PI-children \( F(2,57)=4.927; p<.004 \)\(^{15}\).

Errors of Category 1, 2 and 3 did not occur very frequently in the data of both groups of children. PI-children showed a few more errors in Category 1 and 2 than the N-children, but the differences were not significant \(^{16}\).

\(^{13}\) ANCOVA with Subject-verb agreement errors (Category 4), total number of Subject-verb agreement errors as covariate and group (N-PI) and age (4-6-8yrs) as independent variables. Main effect for group\( \times \)age interaction was not significant.

\(^{14}\) ANCOVA with Subject-verb agreement errors (Category 4) with topicalization as dependent variable, total number of Subject-verb agreement errors as covariate and group (N-PI) and age (4-6-8yrs) as independent variables. Main effects for group and group\( \times \)age interaction was not significant.

\(^{15}\) One-way ANOVA with Subject-verb agreement errors (Category 4) with topicalization as dependent variable and age (4-6-8yrs) as independent variables in PI-children.

One-way ANOVA with Subject-verb agreement errors (Category 4) with topicalization as dependent variable and age (4-6-8yrs) as independent variables in N-children.

\(^{16}\) ANCOVA with Subject-verb agreement errors (Category 1), total number of Subject-verb agreement errors as covariate and group (N-PI) and age (4-6-8yrs) as independent variables. Main effect for group\( \times \)age interaction was not significant.

ANCOVA with Subject-verb agreement errors (Category 2), total number of Subject-verb agreement errors as covariate and group (N-PI) and age (4-6-8yrs) as independent variables. Main effect for group\( \times \)age interaction was not significant.
7.3.3 Conclusion: Subject-Verb Agreement Errors

Many errors of Category 1 or 2 indicate an (E)OI stage, as is found in English-speaking SLI-children, and imply no acquisition of verb second (Rice et al., 1995). Placement of the verb in second position is a prerequisite for correct person and number marking. Since errors of the 1 or 2 type rarely occur in PI-children, we conclude that verb second is acquired in these children. Too many errors of Category 3, characterized by a lack of an inflectional agreement marker, resulting in a T-unit with a stem form (Dutch: infinitive minus -en) of the verb in second position, imply that verb second is acquired, but the inflectional marker between the subject and the lexical verb is missing. This indicates absence of an agreement paradigm for the lexical verb (Wijnen, 1998). The infrequent presence of Category 3 errors indicates that in the PI-children the agreement paradigm for the lexical verb is almost acquired. However, PI-children make significantly more agreement errors of the Category 4 type (incorrect marking of person and number between the subject and the verb) compared to the N-children, even in the oldest PI-children. Since the production of this type of error is part of normal development in children younger than five years (Bishop and Rosenbloom, 1987), the results in the PI-children suggest a delayed acquisition of the person and number paradigm.

In SLI-children, the error Categories (1+2), 3 and 4 are quite common (De Jong, 1999). As stated by De Jong (1999:73) most of the SLI-children may be beyond the (E)OI stage, but some SLI-children persist in preferring infinitives in sentence final position. They prefer to use infinitives in sentence final position and seem to be in the initial stage of development of verb placement and morphology expressing agreement relations. Even when finiteness appears to be available in SLI-children beyond the (E)OI stage, proper agreement marking is often lacking, and they use no inflectional markers in second position or wrong number markers.

A remarkable difference is that nearly all PI-children are beyond the infinitive stage, having acquired verb second. They make almost no errors of Category (1 + 2) as opposed to a subgroup of SLI-children. Another difference between the PI-children and SLI-children is that the PI-children make almost no Category 3 errors as opposed to the SLI-children, who frequently lack agreement marking on the verb in second position.

The PI-children seem to have arrived in the final developmental stage of subject-verb agreement, particularly involving the ability to split the paradigm (person and number) for the lexical verb as opposed to the SLI-children. In both groups of children a similar amount of Category 4 errors is found: the PI-children show a comparable pattern of wrong person/number marking between the subject and the verb, although the PI-children make more Category 4 errors than Category (1+2+3).

*ANCOVA with Subject-verb agreement errors (Category 3), total number of Subject-verb agreement errors as covariate and group (N-PI) and age (4-6-8yrs) as independent variables. Main effect for group*age interaction was not significant.*
errors, as opposed to the SLI-children who make fewer Category 4 errors than Category (1+2+3) errors.
In sum, since the differences are more prominent than the similarities, we conclude that the PI-children are performing better in realizing subject-verb agreement (95% correct) than the SLI-children (less than 90% correct), although the PI-children make significantly more errors with the person/number marking between the subject and the verb than the N-children (98% to nearly 100% correct). The observed errors in verb morphology contribute to the ungrammaticality of the T-unit found in 4.2 and 4.3.

7.4 Errors in Determiner-Noun Agreement

7.4.1 Research questions, definitions and operationalisations
Determiners are another functional category in which variation can occur between languages. Languages vary with respect to the extent to which agreement (number, gender and person features) between specifier (noun) and head (determiner) are morphologically realized (Haegeman, 1994), being encoded in determiners to a greater extent than in nouns or pre-nominal modifiers (Atkinson, 1992). Determiners lack 'descriptive content'. Their semantic contribution is second-order, regulating or contributing to the interpretation of their complement: they mark grammatical or relational features (Abney, 1987).

Noun phrases (NP's) are generally used to refer to entities (e.g. persons or things) in a given domain of discourse (see also 13.5 to 13.7). Within a generative framework the NP is inside a higher functional projection, i.e. the Determiner Phrase (DP). The head of this projection Det is occupied by the determiner (Haegeman, 1994). D carries the feature /+1/ or /-1/ specificity, like in 'het proefschrift' (the dissertation), where the definite article 'het' (the) acts as a determiner and takes a noun, in this case 'proefschrift' (thesis) as its complement. The Num(ber) Phrase is a second functional projection inside the DP, where Num stands for Number. The head Num can be filled by numerals for instance, and it carries the feature /+1/ or /-1/ plurality.

Many theoretical linguists (e.g. Roeper, 1988) suppose that in normal child language the knowledge and use of fully expanded phrase structure is preceded by a stage in which elements, such as determiners, are adjoined to other elements, such as nouns and verbs, instead of forming an embedded structure by functional projections (spec-head or head-complement configuration). In normal development children first have to learn which syntactic categories belong to the Determiner Phrase. They need to learn that the lexical category noun belongs to the syntactic category N, as does adjective to A, numeral and indefinite article to Num, definite article and demonstrative, personal, possessive and interrogative pronoun to Det. If a child has knowledge of this categorization, the linear ordering of these different elements must be learned. Finally, a learning issue for the child is the specific agreement relation between the ordered elements. In Dutch, nouns are accompanied by articles that are freestanding pre-noun function words. These are often weak syllables preceding the strong syllable of the following noun. Articles are grammatically marked for number,
gender, and case. Dutch errors with respect to determiner-noun agreement involve a failure to make a proper gender choice between the singular article 'de' (feminine/masculine form) and the neuter form 'het', or comparable mistakes regarding demonstrative pronouns ('deze' 'die' (feminine/masculine form) vs. 'dit' 'dat' (neuter form)). In normal Dutch development the stage of underspecification of the definite article, i.e. the usage of 'de' for 'het' goes together with the proper use of the definite determiner. This is another example of a fade-in phenomenon during development (Van Kampen and Wijnen, 2000:273) (see 7.2 and 7.3).

Dutch-speaking children's first noun phrase-type structures consist of bare nouns and proper nouns as well (Verlinden and Gillis, 1988). Before their second year, children start to use more elaborate noun phrases starting with a schwa-element reminiscent of the indefinite article 'een' (a, an) (Bol and Kuiken, 1988). Verhulst-Schlichting (1987) also indicates that 'een' (a, an) is the first determiner that Dutch-speaking children use. Until now there have been no reports of Dutch-speaking children using a schwa in front of proper nouns. Articles in noun phrases appear by the age of two years and in 50% of the cases in object position. By the age of three years only 22% of the articles in obligatory context are missing (Schaeffer, 1997).

It is not quite clear what the order of emergence or frequency of occurrence is of the definite articles and demonstrative determiners in combination with a noun. But various examples of child utterances throughout the relevant literature show that such combinations are certainly present in the first half of the third year. There is some evidence that the definite article 'het' (the) appears somewhat later than the definite article 'de' (the), but there is not much information available on this point (Schaerlaekens and Gillis, 1987; De Houwer, 1990). Adjective-noun combinations without a determiner are used quite regularly after the age of two years. With the age of three more complex noun phrases combining a determiner, adjective and a noun appear (Bol and Kuiken, 1988; De Houwer, 1990). From this age on Dutch-speaking children tend to use this adult word order within noun phrases.

Experimental studies investigating determiner usage by somewhat older children confirm that the acquisition of syntactic gender in Dutch may be a long drawn-out process (Extra, 1978; Wijnen, 1984; Deutsch and Wijnen, 1985; Goossens, 1989). Syntactic gender is also expressed by means of independent demonstrative pronouns. Bol and Kuiken (1986) report that the earliest use of these is restricted to the pronouns 'deze/die' (this/that), which are the non-neuter forms. Quite soon after this initial use, children start to use the neuter forms 'dit/dat' (this/that) as well, although the appropriateness has not been analysed (Bol and Kuiken, 1986).

Dutch-speaking children of four years old use a variety of noun phrases: they use noun phrases with a nominal, adjectival or pronominal head. These children use the expected combinatorial pattern and for example appropriately combine an article with a noun (De Houwer and Gillis, 1998).

SLI-children show a delay in the acquisition of noun phrase morphology. They have difficulties with the functional category determiner and show significantly more missing articles and adjectives in the noun phrase (e.g. Leonard, 1995; Hansson, Nettelbladt and Leonard, 2002). Research in Dutch pre-school SLI-children shows that they have difficulties in acquiring determiner-noun agreement, although the
amount of non-agreement still falls within the normal range (Leemans, 1996:10). The SLI-children show correct combinations of one functional element, such as a determiner, numeral, adjective or quantifier with a noun. The difficulty, however, seems to be to embed these structures into larger, hierarchically more complex phrases. Thus, SLI-children hold on longer to a 'flat' phrase structure than normally developing children (Leemans, 1996). Also children with Williams' Syndrome show clear morphological/syntactic problems with functional categories: they have difficulties in the use of grammatical gender assignments between the determiner and the noun (Karmiloff-Smith et al., 1997).

Here we address the issue whether the PI-children show more determiner-noun agreement errors within the conversational interview compared to the N-children and if they do, which type of determiner errors are made in comparison to N-children. And, is there a comparable development with age?

In order to get insight in the different error types related to the use of determiners, we divided the errors in missing determiners within a noun phrase and in incorrect determiner forms, i.e. gender and form errors and inappropriate use of determiners (Table 7.12).

The total number of 50 T-units is used to determine the rate at which determiner errors occurred. Although determiners include articles, demonstrative pronouns, personal, possessive and interrogative pronouns used adjectivally, we only analysed errors with the article-noun agreement. The functional categories Numeral and Adjective are excluded from the error-analysis. In a T-unit more than one determiner error can occur. In order to get insight in the different type of determiner errors in the PI-children, we divided the errors into specific categories.

In Dutch two kinds of agreement relations must be expressed: 1. The number and gender agreement of Det, Num or Adjective with the noun. 2. The agreement between quantifier and noun phrase and genitive case-marking (Leemans, 1996:3). Since no morphological/syntactic errors of the last type of agreement relation (2) were found in the data, we limited our analysis to errors of the type agreement relation (1).
Table 7.12  Incorrect use of determiners: error-types used in the morphological/syntactic analysis

<table>
<thead>
<tr>
<th>Determiner error</th>
<th>Type of errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missing determiner</td>
<td>Omission of Det, Num or A in an obligatory context</td>
</tr>
<tr>
<td>Category 1</td>
<td>gender agreement error between Det, Num or A and the noun</td>
</tr>
<tr>
<td>Category 2</td>
<td>number agreement error between Det, Num or A and the noun</td>
</tr>
<tr>
<td>Category 3</td>
<td>Erroneous addition of Det, Num or A within the noun phrase</td>
</tr>
</tbody>
</table>

First, **missing determiner-noun agreement relations** in an obligatory context are counted in the analysis. Obligatory contexts for the realization of determiners are overtly produced noun phrases, regardless of their syntactic function. Missing determiner-noun agreement errors involve the omission of the (in)definite articles (Example 9), of the demonstrative or the possessive pronoun with a noun.

**Example 9**  Missing determiner: omitted indefinite article within a noun phrase in Dutch (PI-child; age 4;11)

Rick::

```
toen had ik # <-> poppetje bij.
then-had-l-<>-little-doll-by.
(then l had <> little doll)
```

Paraphrase:

```
toen had ik <een> poppetje <er>bij.
then-had-l-<a>-little-doll-by.
(then l had a little doll)
```

In Example 9, an indefinite article that is obligatory in the produced noun phrase is missing.

Second, errors in explicitly produced determiners are counted and specified in three types. The first type of determiner error of Category 1 is a **gender agreement error**: an agreement error in gender of the definite article (Example 10) and the demonstrative pronoun with a (proper) noun (Haeseryn et al., 1997).

**Example 10**  Determiner error of Category 1: gender agreement error of the definite article within a noun phrase in Dutch (PI-child; age 4.5)

Bas:

```
en die was (bij) in de campingbedje (in) <-> liggen.
and-he-was-in-the-little-camp-bed-lay-down.
```

(and he lay down in the little camp bed)
The ability to realize functional categories: tense and agreement marking

Paraphrasis: en die was (bij) in <het> campingbed je <aan> liggen. 
and he was in the little camp bed lay down. 
(and he lay down in the little camp bed)

In Example 10, a gender error is made: the masculine/feminine article 'de' (the) is used in stead of the neuter form 'het' (the), which is appropriate with the realized noun phrase 'in Ø campingbedje' (in Ø little camp bed). In Dutch, these error types concern the use of the definite article 'de' (the) for the masculine or feminine form instead of the neuter form 'het' (the) and vice versa. Also the use of the masculine or feminine form of the demonstrative pronouns 'deze' and 'die' instead of the neuter forms 'dit' and 'dat' and vice versa. The use of an indefinite article 'een' (a) for the definite article 'de/het' and vice versa is not analysed as a grammatical error, but as a pragmatic error. The problems in establishing co-referential cohesion are described in 13.8.

The second determiner error-type of Category 2 is a number agreement error between the determiner and the noun. Number agreement errors that are included in the analysis are wrong number in the (in)definite article (Example 11), demonstrative pronoun, possessive pronoun, numeral, or adjective with a (proper) noun.

Example 11    Determiner error of Category 2: number agreement error of the indefinite article with the noun in Dutch (PI-child; age 4:2)

Gary:        een klein kindjes kun niet.
            a little children can not.
            (a little children can not)

Paraphrasis: <> klein<> kindjes <kunnen> <dat> niet.
            <>-little-children<-can>-<that>-<not>.
            (little children can not do that)

In Example 11, the singular indefinite article 'een' (a) is wrongly used with the plural noun 'kindjes' (children) that results in a number agreement error between the determiner and the noun. In this case we did not classify the error as an error of the plural form of the noun (e.g. 'een klein kindje' (a little child)). Also the inflectional form of the adjective 'klein' (little) is wrongly used in the contexts of the plural noun and should be 'kleine' (little-Ø). So this T-unit includes two number agreement errors as compared to the paraphrased goal sentence. Finally, the determiner error of Category 3 concerns erroneous addition of (in)definite articles, demonstrative pronouns and numeral pronouns with a (proper) noun in a non-obligatory context. Errors of Category 3 indicate an overspecification of the mentioned referent expressed by a specific type of noun, namely a proper noun (Example 12).
Example 12  Determiner error of Category 3: erroneous addition of definite article with a proper noun in Dutch (PI-child, age 4.5)

Kimberley:   en de Bimbo is de kleinste [van twee poezen].
       and-the-Bimbo-is-the-smallest [of two cats].
Paraphrase:   en <-> Bimbo is de kleinste [van twee poezen].
       and <-> Bimbo-is-the-smallest [of two cats].

In Example 12, the proper noun 'Bimbo' (Bimbo), the name of a cat refers to a specific cat in the real world. By adding a definite article to the proper noun the child overspecifies the mentioned referent 'Bimbo' and this is therefore classified as a determiner error (Category 3) in Dutch. In Dutch, it is ungrammatical to use a determiner with a proper noun as it is in English, although some languages like German do allow it.

7.4.2 Results: Determiner-Noun Agreement Errors

First, we will present all error categories of determiner-noun agreement relations (Category 1, 2 and 3), including the Category of 'missing' determiner in a determiner-noun relation (Table 7.13).

Table 7.13  Mean total number, mean percentage (related to 50 T-units) and standard deviation of determiner-noun agreement errors in 45 N-children and 120 PI-children

<table>
<thead>
<tr>
<th>Determiner-noun agreement errors</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>4 yrs</td>
<td>2.13</td>
<td>4.3%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6 yrs</td>
<td>1.00</td>
<td>2.0%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.20</td>
<td>0.4%</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>1.11</td>
<td>2.33%</td>
</tr>
</tbody>
</table>

Clearly, the PI-children have significantly more problems in establishing agreement relations between the functional category determiner and the noun than N-children in the interview-genre\(^\text{17}\) (F(1,99)=15.933; p<.000), as is shown in Table 7.13. Also a

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\(^{17}\) Since the obligatory contexts (number of noun phrases) were comparable in both groups (no significant main effect was found), an ANCOVA with the number of noun phrases as covariate was not indicated. Therefore an ANOVA over percentages was used (see also 13.4).
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main effect for age is found in both groups (F(2,99)=7.531; p<.001) (see Figure 7.3). As expected, the N-children showed a linear decrease with age (p<.000; Eta squared .26; R squared .26) related to determiner-noun agreement errors in general, as the PI-children did (p<.001; Eta squared .13; R squared .10).

When we look at the development with age, we see that PI-children in all age groups show problems in expressing determiner-noun agreement relations. Although there is a linear decrease of agreement errors with age in the PI-children, it is evident from Figure 7.3 that the older PI-children of seven, eight and nine years do not catch up with the six and eight year old N-children.

Figure 7.3  Development with age of percentage of determiner-noun agreement errors (related to 50 T-units) in N-children and PI-children

A further analysis shows the types of errors made. First, in Figure 7.4 the proportion of errors, characterized by a missing determiner, as opposed to errors in determiner-noun agreement (not missing, but incorrect determiner) are presented. All children, except for the six-year-old N-children, show relatively more problems in overtly realizing determiner-noun agreement relations and relatively fewer problems in making determiner-noun agreement errors. Unexpectedly, the eight-year-old N-children show only missing determiner-noun agreement relations and no agreement errors at all. We have no explanation for this except that the numbers are so small (see Table 7.13).

ANOVA with total number of Determiner-Noun agreement errors in general as dependent variable and group (N-PI) and age (4-6-8yrs) as independent variables. Main effect for group*age interaction was not significant.
18 One-way ANOVA with total number of Determiner-Noun agreement errors in general as dependent variable and age (4-6-8yrs) as independent variable in N-children.
19 One-way ANOVA with total number of Determiner-Noun agreement errors in general as dependent variable and age (4-6-8-9yrs) as independent variable in PI-children.
20 Only data are available of the four, six and eight year old normally developing Dutch children (Roelofs, 1998) with respect to Determiner-Noun agreement errors.
As is shown in Table 7.14, the PI-children have significantly more omitted determiner-noun agreement relations than the N-children (F(1,99)=15.854; p<.000)\(^{21}\). Also a main effect for age is found in both groups (F(2,99)=5.526; p<.005).

Table 7.14 Mean total number, mean percentage (related to 50 T-units) and standard deviation of missing determiner-noun agreement relations in 45 N-children and 120 PI-children

<table>
<thead>
<tr>
<th>Missing determiner-noun agreement</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>4 yrs</td>
<td>1.07</td>
<td>2.1%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.20</td>
<td>0.4%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.20</td>
<td>0.4%</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.49</td>
<td>1.0%</td>
</tr>
</tbody>
</table>

In Figure 7.5, we show the development with age in establishing determiner-noun agreement relations. As expected, we found a decrease with age of missing determiner-noun agreement relations in the N-children that can almost fully be

\(^{21}\) ANOVA with missing Determiner-Noun agreement relations as dependent variable and group (N-PI) and age (4-6-8yrs) as independent variables. Main effect for group*age interaction was not significant.
explained as a linear trend \((p<.007)\)^{22}. Within the PI-children the decrease can only partly be explained as a linear trend \((p<.002)\)^{23}.

**Figure 7.5** Development with age of percentage of *missing determiner-noun agreement relations* (related to 50 T-units) in 45 N-children and 120 PI-children

With age N-children learn to establish obligatory agreement relations between the DET and the noun. Especially between four and six years old the missing determiner-noun agreement relations decrease substantially in the N-children. This development differs from the development found in PI-children. In the older PI-children still half of the total number of determiner-noun agreement errors is due to omission of an obligatory determiner-noun agreement relation. Thus, more noun phrases produced by the PI-children lack obligatory grammatical information that has not only a negative impact on grammaticality (see 4.2 and 4.3), but also on co-referential cohesion (see 13.5 to 13.7).

In Table 7.15, the total number of determiner-noun agreement errors and the different types of errors are presented. We found that PI-children do not have significantly more determiner-noun agreement errors in general than N-children^{24}.

---

22 One-way ANOVA with missing Determiner-Noun agreement relations as dependent variable and age (4-6-8yrs) as independent variable in N-children.

23 One-way ANOVA with missing Determiner-Noun agreement relations as dependent variable and age (4-5-6-7-8-9yrs) as independent variable in PI-children.

24 ANOVA with Determiner-Noun agreement errors (minus missing Determiner-Noun agreement relations) as dependent variable and group (N-PI) and age (4-6-8yrs) as independent variables. Main effect for group*age interaction was not significant.
Table 7.15  Mean total number, percentage (related to the total number of determiner-noun agreement errors in 50 T-units) and standard deviation of determiner-noun agreement errors in 45 N-children and 120 PI-children

<table>
<thead>
<tr>
<th>Determiner-noun agreement errors</th>
<th>N-children n=45</th>
<th>PI-children n=60</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>Category 1 Gender error</td>
<td>0.49</td>
<td>82%</td>
</tr>
<tr>
<td>Category 2 Number error</td>
<td>0.11</td>
<td>18%</td>
</tr>
<tr>
<td>Category 3 Erroneous use</td>
<td>0.00</td>
<td>0%</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.60</td>
<td>100%</td>
</tr>
</tbody>
</table>

With regard to the development with age in producing determiner-noun agreement errors, we found a main effect for age in both groups of children (F(2,99)=3.094; p<.050). The decrease with age in the N-children can almost fully be explained as a linear trend (p<.002)25 (Figure 7.6), but the decrease in the PI-children cannot26.

Figure 7.6  Development with age of percentage of determiner-noun agreement errors (related to 50 T-units) in 45 N-children and 120 PI-children

When we look at the results found in the analysis of the different error types, we observe that gender agreement errors between DET and the noun (Category 1) occurred most frequently in the PI and the N-children, although no significant difference with

25 One-way ANOVA with Determiner-Noun agreement errors (minus missing Determiner-Noun agreement relations) as dependent variable and age (4-6-8yrs) as independent variable in N-children.
26 One-way ANOVA with Determiner-Noun agreement errors (minus missing Determiner-Noun agreement relations) as dependent variable and age (4-5-6-7-8-9yrs) as independent variable in PI-children.
these error types were found between the two groups of children.27 (Table 7.15). Obviously, only a small amount of number agreement errors between the determiner and the noun (Category 2) was found.28 The differences between the two populations were too small to be significant. Surprisingly, only the number of erroneous determiner-noun agreement relations in a non-obligatory context (Category 3) differs significantly between PI and N-children ($F(1,99)=7.685; p<.007$).29 Remarkably, in the N-children no error of this type occurred as opposed to the PI-children. Mostly, this type of error was characterized by an erroneous addition of a definite article or a demonstrative with a proper name, causing an overspecified agreement relation. This problem is partly related to problems in establishing clear co-referential cohesion (see 13.5 to 13.7).

7.4.3 Conclusion: Determiner-Noun Agreement Errors

As the results show, the PI-children are able to produce enough determiner-noun combinations to assume the availability of functional category determiner, so the category itself is not lacking. PI-children can produce determiner-noun agreement relations correctly (in 95% of all obligatory contexts) and do not differ at this point from N-children (98% correct in obligatory context) at the age of four, six and eight years. The results also suggest that four-year-old normally developing children establish overt expression of the determiner-noun agreement relations, whereas from age six the determiner-noun agreement paradigm is acquired by most normally developing children. Thus, when children older than four show missing determiner-noun agreement relations, and children older than six show errors in establishing determiner-noun agreement relations, these are clear markers of morphological/syntactic problems in realizing the functional categories involved.

Indeed we found that the PI-children show morphosyntactic difficulties in this area and that they do not catch up with age. They show significantly more omissions, resulting in bare nouns and errors in establishing Determiner-Noun agreement relations compared to the N-children.

PI-children are not significantly different in producing gender or number agreement errors within the noun phrase compared to N-children. In normal development the stage of underspecification of the definite article (wrong usage of 'de' for 'het') goes together with the proper use of the definite article. Traces of a so-called 'extended' fade-in phenomenon (Van Kampen and Wijnen, 2000) – the parallel development of correct and incorrect use – related to determiner-noun agreement is not found in PI-children. PI-children do produce erroneous additions of determiners in a non-obligatory context:

27 ANOVA with agreement errors in gender (Category 1) as dependent variable and group (N-PI) and age (4-6-8yrs) as independent variables. Main effect for age and group*age interaction was not significant.
28 ANOVA with agreement errors in number (Category 2) as dependent variable and group (N-PI) and age (4-6-8yrs) as independent variables. Main effect for age and group*age interaction was not significant.
29 ANOVA with erroneous Determiner-Noun agreement relations in a non-obligatory context (Category 3) as dependent variable and group (N-PI) and age (4-6-8yrs) as independent variables. Main effect for age and group*age interaction was not significant.
they overspecify the mentioned referent, especially with a definite article, which is also pragmatically inappropriate in Dutch (see 13.5 to 13.7). Summarizing, the PI-children show problems with deciding which grammatical and pragmatic information is sufficient for the information exchange within the normal boundaries.

7.5 General conclusions: the ability to realize functional categories (tense and agreement marking)

With regard to the PI-children's ability to produce functional categories that are associated with specific bound grammatical morphemes such as tense and agreement markers (subject-verb and determiner-noun), we must conclude that they do not show evidence of a modular deficit (see 2.3.2). We follow Radford's idea (1990) that all functional categories are connected to a single module of syntax that is subject to maturation. A crucial prediction is that all morphological elements associated with the functional categories will start to appear at (approximately) the same time in normal development. However, the symptoms of tense and agreement marking between subject-verb and determiner-noun found in the PI-children do not pattern that way.

Table 7.16 presents an overview of the results of the errors in functional categories in the PI-children.

### Table 7.16

<table>
<thead>
<tr>
<th>Errors functional categories</th>
<th>N-children N=45/240</th>
<th>PI-children N=60/120</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tense marking errors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simple past tense errors</td>
<td>0.5%</td>
<td>1.9%*</td>
</tr>
<tr>
<td>Category 1 (overgeneralizations)</td>
<td>0.2%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Category 2 (omission of simple past tense within a T-unit)</td>
<td>0.1%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Category 3 (omission of simple past tense between T-units)</td>
<td>0.2%</td>
<td>1.3%*</td>
</tr>
<tr>
<td><strong>Subject-verb agreement errors</strong></td>
<td>1.5%</td>
<td>4.6%*</td>
</tr>
<tr>
<td>Category 1 (no verb second – infinitive in final position)</td>
<td>0.1%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Category 2 (no verb second – past participle in final position)</td>
<td>0%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Category 3 (verb stem form in second position)</td>
<td>0.02%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Category 4 (wrong person/number marking of verb in second position)</td>
<td>1.4%</td>
<td>4.1%*</td>
</tr>
<tr>
<td><strong>Determiner-noun agreement errors</strong></td>
<td>2.2%</td>
<td>4.6%*</td>
</tr>
<tr>
<td>Missing agreement relation</td>
<td>1.0%</td>
<td>2.8%*</td>
</tr>
<tr>
<td>Category 1+2+3 (wrong gender/number marking; erroneous addition)</td>
<td>1.2%</td>
<td>1.8%*</td>
</tr>
</tbody>
</table>

* significant difference at the .05 level
PI-children do not have significantly more problems with inflectional morphology like simple past tense forms compared to normal peers: but they often take the present tense form as a substitution for the simple past tense form, instead of missing tense marking. Within intra-clausal obligatory contexts for simple past tense, they do not show severe problems with the choice of the proper tense with a past adverbial or a tense-shift between a main and a subordinate clause within a single T-unit, comparable to Dutch SLI-children (De Jong, 1999). However, a significant difference is found in producing tense errors between main clauses in extended discourse with a narrative character (obligatory context) compared to normal peers. PI-children shift the time-line between clauses from present to past and vice versa too frequently with regard to the appropriate context. These results of shifting tense incorrectly do not justify the conclusion that grammatical rules or features that underlie them are absent in PI-children: evidence of a delayed acquisition of the paradigm for tense is not found. The symptoms are better explained by a processing-based explanation (see 2.3.1) and could also be related to problems in the use of language-specific devices of coherence (see 12.4 to 12.8).

Furthermore, the PI-children have significantly more subject-verb agreement errors than the N-children, but the type of error mainly involved is the incorrect marking of person and number between the subject and the verb. This type of error indicates a delayed development of the proper person and (singular-plural) number paradigm, but evidence of a real (E)OI stage — a stage in which children fail to mark verbs for agreement and which implies no acquisition of verb second as is found in English- and Dutch-speaking SLI-children (Rice et al., 1995; De Jong, 1999) is not found in PI-children. Although a subgroup of Dutch SLI-children (De Jong, 1999) also alternate infinitive verb forms with errors in finite verb forms in sentence second position, no evidence of this kind is found in PI-children. The results of the subject-verb agreement analysis in PI-children do not justify problems with building-up an agreement paradigm for the lexical verb.

Most vulnerable in PI-children are the significantly missing determiner-noun agreement relations found in an obligatory context. They also make too many erroneous additions of determiners in a non-obligatory context. The relatively frequently observed absence or over-use of determiners in the PI-children might be solely caused by problems with co-referential cohesion (see 13.4 to 13.7). School-aged normally developing children have to develop a sense of giving information about one specific entity out of a set of entities. When children want to explicate certain behaviours of such an entity, they have extreme difficulties in differentiating whether the behaviour can be attributed to only the one specific entity (option a) or to the whole set of entities (option b). For option (a) a determiner is necessary and for option (b) the determiner can be left unexpressed in combination with a plural noun; using a singular noun without an article is ungrammatical in Dutch. PI-children show difficulties in integrating semantic/pragmatic information organizing rules into a morphological/syntactic paradigm for determiner-noun agreement relations. It seems that the PI-children have problems in deciding which grammatical and semantic/pragmatic information is sufficient for the information exchange within the normal boundaries.
With respect to the determiner-noun agreement errors PI-children did not differ significantly in the number of errors in gender or form within the noun phrase. These findings suggest that the developmental pattern of determiner use starts with no realization of determiners (0;0 to 2;0 years), followed by a parallel correct and incorrect realization of determiners (2;0 to 3;0 years). By age four children have more or less acquired the determiner-noun agreement paradigm (STAP; Van den Dungen and Verbeek, 1994, 1999). From age four on they have to apply these rules in different communicative settings resulting in very infrequent errors related to the fine-tuning application of the gender and number morphological marking of determiner-noun agreement relations (4;0 to 6;0 years). The data suggest that the PI-children follow this development.

To summarize, the problems with tense and agreement marking in PI-children show a great variability and confirm the presence of an uneven profile in PI-children (e.g. Leonard, 1996): the oldest nine-year-old PI-children frequently resemble the youngest four-year-old N-children in showing omissions of simple past tense forms, number marking errors between the subject and the verb, missing determiners and gender errors between the determiner and the noun (see Table 7.16). Overall, PI-children show a delay in using grammatical rules for the realization of functional categories, particularly rules related to tense and agreement, compared to the N-children.

No real evidence is found for a functional modular deficit in the acquisition of the paradigms (see 2.3.2). A better explanation for the problems in PI-children is a limitation in their processing capacity (e.g. Tannock, Purvis and Schachar, 1993; Tannock and Schachar, 1996; see 2.3.1) and a disability in their pragmatic skills of co-referential cohesion (see 13.5 to 13.7). The morphological/syntactic problems found influence the grammaticality of the sentence negatively (see 4.2 and 4.3).
8 The ability to package morphologically/syntactically: connectivity and transitivity

Annette Scheper

8.1 Introduction
Part of development in any language, in particular in extended discourse, involves learning how to morphosyntactically package clauses into larger constructions in which some clauses play subordinate roles in the sentence structure or in the discourse. As is well known, younger children have a lower mean length of utterances than older children, a smaller vocabulary, a less well developed capacity to pay attention, and also a more limited memory workspace. As children grow older, the complexity of their language increases together with their cognitive and processing abilities (see 2.3.1). Normally developing children need to learn to exchange coherent information in extended discourse by means of morphosyntactic packaging, which is based on language specific rules establishing connectivity in, for example, clausal ellipsis and embedding and establishing transitivity in, for example, the use of a 'full' transitive verb and its obligatory arguments.

Lengthy sentences are used to express multiple ideas. By means of creating connectivity and transitivity the length of the sentences increases. The establishment of connectivity and transitivity are constrained by specific morphological/ syntactic rules that normally developing children need to acquire. Deficits in the ability to package morphosyntactically will prevent children from clearly expressing their feelings, thoughts, and desires in a manner that can be easily comprehended by listeners. Deficiencies in the production of complex sentences will make children less intelligible, which may even result in peer ridicule (Baker and Cantwell, 1982). It is found that English-speaking SLI-children show more grammatical difficulties in sentences with greater argument-structure complexity (e.g. Grela and Leonard, 2000): these children omitted more grammatical morphemes when attempting sentences with a full transitive verb frame. Also severe problems in using and understanding syntactically complex or elaborated sentences are found in English-speaking PI-children with externalizing and internalizing symptoms (Miniutti, 1991; Ruhl, Hughes and Camarata, 1992): they showed significantly lower Mean Length of Utterance (MLU) and more relational discourse errors than their same-age normally developing peers (McDonough, 1989). Also Dutch-speaking PI-children with PDD-NOS had particular difficulties in establishing coherence in extended discourse that is partly based on the ability to package morphosyntactically (Haijkens, 1997) (see 2.3.1).

Since the production of complex sentences can provide insight into the linguistic competence of the Dutch-speaking PI-children, here we want to determine to what extent PI-children can produce more complex morphological/syntactic structures and features. These complex structures could prove a major obstacle for PI-children who are also expected to listen to complex sentences in extended discourse.
From the preceding chapters (Chapters 4 to 7) we already know that PI-children produce significantly more errors with the realization of lexical and functional categories, resulting frequently into ungrammaticality. In order to gain a deeper insight into the morphological/syntactic complexity of the conversational abilities of PI-children, we carried out an analysis of complexity that indicates which morphological/syntactic phenomena exist in the spontaneous language production in the conversational genre of PI-children.

Since the basic assumption is that utterance length increases with syntactic complexity, the Mean Length of Utterance (Brown, 1973; Crystal 1974) and the related measurement the Mean Length of the 5 Longest Utterances (e.g. Van den Dungen and Verbeek, 1994, 1999) are used to measure the ability to package morphosyntactically in general in PI-children compared to their same-age normally developing peers (see 8.2). Next, the ability of connectivity is analysed. By means of clausal ellipsis, T-units expressed by the children are connected to those of the interviewer. By means of conjunction reduction or gapping, two clauses within one T-unit expressed by the child are connected. Lastly, by means of embedded clauses one main clause is connected to one or more subclauses within one T-unit expressed by the child. All three types of connections are examples of the ability to package morphosyntactically and involve complex morphological/syntactic skills. First, the production of grammatical clausal ellipsis is described in order to determine the ability to produce reduced clauses that are a one-to-one mapping of the underlying morphosyntactic form of the answer to the morphosyntactic form of the question asked without causing ungrammaticality (see 8.3). Second, the syntax of clause-combinations is another part of the ability to package morpho-syntactically: the central issues are the inter-clausal relation by conjunction reduction or gapping (see 8.4) and by subordination (see 8.5). Furthermore, the complexity of (lexical) verb structures is analysed, particularly the degree of transitivity. Here we look at the use of obligatory or optional object verbs that take internal arguments as opposed to the use of intransitive and copula verbs that do not (see 8.6). Specific types of obligatory object verbs are discussed, like split verbs and semantically light verbs (see 8.7). Finally, the general conclusion with respect to the ability to package morphosyntactically is described (see 8.8).

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1 A handbook for the analysis of conjunction reduction constructions and embedded clauses has been developed (Scheper, 1996).
8.2 The length of the T-unit: MLU and MLUL

8.2.1 Research questions, definitions and operationalisations

Many studies of developmental language disorders use a group of younger normally developing children matched to the children with language disorders on some measure of language ability. The level of language development is often defined in terms of MLU, since it uses no specific information about the structure of children's sentences (e.g. Brown, 1973; Crystal, 1974; Wells, 1985). Individual children's MLU appears to be a more accurate measure of linguistic ability than age (Brown, 1973:54). MLU is especially appropriate when the study focuses on the production of morphological/syntactic forms that require some minimum utterance length. There can be important differences in relative grammatical competence among children with the same average utterance length. The morphosyntactically most interesting period to use MLU as a measure for language complexity is between 1.75 and 3:6 morphemes (Arlman-Rupp, Van Niekerk-de Haan and Van de Sandt-Koenderman, 1976; Wells, 1985; Hickey, 1991). In this period MLUm is a reliable measure for children's early grammatical development. The MLUm of more than 3.6 morphemes does not always reliably reflect the syntactic ability of children. Moreover, since the rules for counting morphemes are unclear in agglutinative languages, such as Dutch, MLU in words (MLUw) is often seen as more appropriate (Crystal, 1974; Wells, 1985).

Specific complex syntactic structures do not always increase the length of the utterance; in fact they may reduce it: for example, the use of the more complex simple past tense results in fewer words or morphemes instead of the less complex perfect tense (see 7.2). However, production of more complex clause structures, such as conjunction reduction and embedded clauses do increase the length of the utterance and indicate more complex syntactic abilities. Therefore, a second index of grammatical development 'the Mean Length of the 5 Longest T-units' (MLUL) (e.g. Van den Dungen and Verbeek, 1994, 1999) is used to examine the length of the most complex clause structures children produce.

Thus, although complex structures are not always reflected in an increase in the number of words, MLUw and MLULw can be indicators for complexity in general and can give insight into whether children are able to fill their clauses with sufficient morphosyntactic information. Since MLUw and MLULw are determined to a large extent by the number of arguments of the verb, we expect that the problems we have already found with realizing obligatory subjects and objects (see 5.3 and 5.4) will influence the MLUw and MLULw negatively.

In this section, we examine whether the PI-children are able to produce utterances of sufficient length as a morphological/syntactic measure for complexity in general and address the question whether PI-children use a shorter MLUw and MLULw than the N-children in the conversational interview. And, is there a development with age?

MLUw is counted here instead of MLUm following the STAP-procedure. STAP counts the "mean total number of communicatively used words per T-unit" related to
the 50 T-units of the conversational interview (Van den Dungen and Verbeek, 1994, 1999:22). Linguistic non-fluencies known as mazes\(^2\), such as filled pauses, word (phrase) repetitions and revisions, are excluded from the calculation of the MLU (e.g. Thordardottir and Weismer, 2002). Compound words and proper names count as a single word. The rate of \(\text{MLU}_w\) is computed by counting all the communicatively used words in the conversational interview divided by 50 (Example 1).

**Example 1**  
**MLU** (PI-child; age 6:1)  
Johan:  
[Dan gaan we] Dan gaan we er buiten mee spelen.  
[Then-go-we]-Then-go-we-there-outside-with-play.  
(Then we go to play outside with it)

In Example 1 the \(\text{MLU}_w\) is 7 and the words used non-communicatively are 3. Similarly, the \(\text{MLUL}_w\) is computed by counting all the communicatively used words in the 5 longest T-units divided by 5. Since no data of \(\text{MLU}_w\) and \(\text{MLUL}_w\) scores are available per N-child from the Roelofs and STAP-population, we use the available z-scores from the STAP-population, using the STAP guidelines (Van den Dungen and Verbeek, 1994, 1999).

### 8.2.2 Results: \(\text{MLU}_w\) and \(\text{MLUL}_w\)

From Table 8.1 (first column) it is obvious that not a significantly high number of PI-children show severe problems with \(\text{MLU}_w\). Only 3% of the PI-children are more than 2 sd from the norm, which means just one PI-child too many. However, a significantly high number of PI-children does show slight problems with \(\text{MLU}_w\) (\(p<.000\)\(^3\)) (Table 8.1; second column): these PI-children produce too short T-units compared to their same-aged normally developing peers. Instead of the expected 16% (as for a normally distributed population) a third (32%) of the PI-children produces too short T-units and thus shows a slight morphological/syntactic disorder related to \(\text{MLU}_w\). 65% of the PI-children show no problems with \(\text{MLU}_w\). The PI-children that have no or slight problems according to their \(\text{MLU}_w\) are more or less equally divided over the age groups.

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\(^2\) According to STAP (Van den Dungen and Verbeek, 1994), these linguistic non-fluencies are called 'non-communicatively' used words.

\(^3\) Binomial test was used in PI-children to measure the differentiation in severe problems \((z \geq -2)\) and slight problems \((-2 < z \leq -1)\) on the variable \(\text{MLU}_w\) according to the STAP-values (Van den Dungen and Verbeek, 1994, 1999).
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Table 8.1  Distribution of total number and percentage of 20 PI-children per age group and total number and percentage of 120 PI-children categorized according to z-scores $z \leq -2$, $-2 < z \leq -1$ and $z > -1$ on the variables $MLU_w$ and $MLUL_w$ in the conversational interview

<table>
<thead>
<tr>
<th>PI-children n=120</th>
<th>$MLU_w$</th>
<th>$MLUL_w$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$z$-scores Normal distribution</td>
<td>$z \leq -2$</td>
<td>$-2 &lt; z \leq -1$</td>
</tr>
<tr>
<td>4yrs</td>
<td>2</td>
<td>10%</td>
</tr>
<tr>
<td>5yrs</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>6yrs</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>7yrs</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>8yrs</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>9yrs</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Total children/%</td>
<td>3</td>
<td>3%</td>
</tr>
</tbody>
</table>

From Figure 8.1 (Appendix 8a) it is evident that the $MLU_w$ shows a slightly developmental increase with age in PI- and N-children, despite the small subgroup (32%) of PI-children that produce significantly shorter T-units compared to N-children. Surprisingly, five and nine-year-old PI-children have a slightly higher $MLU_w$ than their normal peers. Because of the non-availability of individual scores of all the N-children, we only calculated a possible age effect in the PI-children, which showed a partly linear significant increase, since there is scarcely no increase from age six to eight ($F(5, 114)=35.441; p<.000; \eta^2=.30; R^2=.22$).

Figure 8.1  Development with age of $MLU_w$ (related to 50 T-units) in 240 N-children and 120 PI-children in the conversational genre

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4 The $MLU_w$ in eight-year and nine-year-old N-children is assessed by extrapolation, and is similar to the $MLU_w$ scores of the seven-year-old N-children.
With respect to the distribution of MLUL<sub>w</sub>, 6% of all PI-children have severe problems in producing very long complex T-units instead of the expected 2.3% (Table 8.1; second column). However, this difference proved to be non-significant. Again, a significantly higher number of PI-children shows slight problems with producing very long T-units (p<.000), 28% instead of the expected 16%, whereas 66% of the PI-children show no problems at all. Thus, a small subgroup of PI-children does show slight problems with MLUL<sub>w</sub> compared to N-children. The development with age related to MLUL<sub>w</sub> is shown in Figure 8.2 (and Appendix 8b).

Figure 8.2  Development with age of MLUL<sub>w</sub> (related to 50 T-units) in 240 N-children and 120 PI-children in the conversational genre

![Figure 8.2](image)

As can be seen from Figure 8.2, the MLUL<sub>w</sub> increases in the PI- and N-children with age, although the N-children produce slightly longer T-units than the PI-children. Within the PI-children there is a significant age effect, which can only partly be explained as a linear increase (F(5, 114)=19.137; p<.000; Eta squared .21; R squared .13). Furthermore, as expected, an overall significant correlation is found between MLU<sub>w</sub> and MLUL<sub>w</sub> in PI-children: the subgroup of PI-children with a relatively high MLU<sub>w</sub> also has a relatively high MLUL<sub>w</sub> and vice versa (p<.000).

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5 One-way ANOVA with MLU<sub>w</sub> as dependent variable and age (4-5-6-7-8-9yrs) as independent variable is used in the PI-children. These differences can be classified as 'substantial' differences and the percentage variance explained is judged as 'large'.

6 Binomial test was used in the PI-children to measure the differentiation in severe problems (z ≤ -2) and slight problems (-2 < z ≤ -1) on the variable MLU<sub>w</sub> according to the STAP-values (Van den Dungen and Verbeek, 1994, 1999).

7 The variable MLUL<sub>w</sub> in eight and nine-year-old N-children is assessed by extrapolation and similar to the number of the seven-year-old N-children.

8 One-way ANOVA with MLUL<sub>w</sub> as dependent variable and age (4-5-6-7-8-9yrs) as independent variable is used in the PI-children.

9 Pearson Correlation coefficient with variables MLU<sub>w</sub> and MLUL<sub>w</sub> (related to 50 T-units) in 120 PI-children.
8.2.3 Conclusion: MLUw and MLULw

A small subgroup of PI-children produces shorter T-units than N-children. This result is in line with the analysis of omitted lexical and functional categories (see 5.3 and 5.4; 7.2 and 7.4). These grammatical missing categories influence the length of the sentences negatively. Also a small subgroup of the PI-children cannot produce very long T-units compared to N-children, which indicates problems with the ability to package morphosyntactically. Since the results with respect to MLUw and MLULw do not give insight into the type and correctness of the produced clauses, it is necessary to investigate the rate of complex, cross-clausal relations expressed by conjunction reductions (see 8.4) and embedded clauses (see 8.5) that influence the length of the utterance positively.

In a large subgroup of PI-children no problems were found with their MLUw and MLULw. PI-children often use adverbial phrases to locate place and time of an event and thus increase their length of the utterances (see also 6.3). SLI-children frequently produce stereotypic adverbs to fill the empty spaces (e.g. Steckol and Leonard, 1979). However, the use of this type of adverb does not contribute to a semantically clear exchange of information. Just like SLI-children, a closer look at the data shows that PI-children also often produce these stereotypic adverbs10, like 'zo' (just), 'goed' (right), 'daar' (there), 'dan' (then), increasing the length of utterances.

8.3 Connectivity by the use of Clausal Ellipsis

8.3.1 Research questions, definitions and operationalisations

Grammatical ellipsis consists of the omission of one or more sentence constituents, frequently the lexical categories subject and verbal predicate that are redundant with respect to a prior message (e.g. Root, 1992; Haeseryn et al., 1997). The occurrence of ellipsis provides evidence that speakers are able to take account of prior linguistic reference in order to eliminate the redundant elements from their own speech and that of others. The rules for the elimination of redundancy through ellipsis vary cross-linguistically. Ellipsis is an important means for achieving cohesiveness in extended discourse (e.g. Halliday and Hasan, 1976; Bloom and Lahey, 1978; Roelofs, 1998; see also 13.2).

In order to establish grammatical ellipsis only specific morphological/syntactic categories can be left implicit. According to the Principles and Parameters framework (see 2.3.2), these empty categories are under control of the so-called Empty Category Principle (ECP) that is 'the principle that an empty category must be governed'. This has been postulated as a component of Universal Grammar (Chomsky, 1981). 'Dropped categories' are bound to an empty operator in the complementizer position or the head in the sentence representation, which in turn is

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10 Stereotypic adverbs are semantically 'light' adverbs, like 'zo' (just) or 'goed' (right). According to STAP (Van den Dungen and Verbeek, 1994, 1999) these adverbs are not counted in the morphological/ syntactic analysis of adverbial expressions, but are counted in the semantic/pragmatic analysis when providing too little information (see 12.5).
linked to an antecedent outside the sentence: another category in the surrounding discourse from which it gets to pick up its content. When the complementizer position is lexically filled, it can no longer bind an empty argument position (e.g. Heim, 1993, 1995; Wijnen and Verrips, 1998).

Specific lexical categories are involved in order to establish grammatical ellipsis, namely the noun phrase (NP), the verbal phrase (VP) or the clausal phrase (Haegeman, 1991). Discourse topic drop (see also 5.3 and 5.4) is an example of nominal ellipsis between clauses in which the subject or object in sentence-first position is left implicit and the referent has clearly been established in the preceding clause. This form of grammatical ellipsis serves to create tightly packed verb-initial clauses with no surface subject (e.g. De Haan and Tuijnman, 1988; Berman and Slobin, 1994). Nominal ellipsis within clauses is also used by means of the construction of conjunction reduction in which two clauses are connected with an obligatory coordinate conjunction and the elimination of the nominal element (i.e. the subject), resulting in a verb-initial clause. This specific relationship between two clauses indicates subsequent actions and establishes connectivity between clauses (Halliday and Hasan, 1976). Also verbal ellipsis within clauses is used by means of the construction of gapping, in which the verbal element instead of the nominal element is eliminated resulting in a verbless clause. This relationship between two clauses indicates the same action and establishes connectivity (Halliday and Hasan, 1976; Berman and Slobin, 1994) (see 8.4 and 13.3).

Another form of grammatical ellipsis is clausal ellipsis involving reduction of a clause by the elimination of one or more constituent(s). Clausal ellipsis indicates a closer relation between the reduced clause and the preceding utterance, mostly a question (Haeseryn et al., 1997:1114). Instances of grammatical clausal ellipsis are described in order to determine the ability to produce complex, reduced clauses without causing ungrammaticality. This specific form of ellipsis – grammatical clausal ellipsis – is the main subject of this section.

Normally developing children need to learn the morphological/syntactic and semantic/pragmatic rules to apply grammatical clausal ellipsis in communication. The development of clausal ellipsis starts from the age of three years, but this process continues well into the school years (Berman and Slobin, 1994).

Frequent incorrect use of clausal ellipsis can indicate an inability to produce independent complex sentences. Therefore, we investigate whether PI-children produce the same number of correctly formed clausal ellipsis compared to N-children. And, is there a comparable development with age

Clausal ellipsis is often a reaction to a preceding question and therefore indicates a close relationship between the question and the subsequent utterance (Haeseryn et al., 1997:1114). As described in 8.2.1, in the conversational interview a question from the interviewer is followed by two types of morphological/syntactic units of the child: an independent T-unit or a dependent elliptical answer, i.e. a T-unit with
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clausal ellipsis\(^{11}\) (Van den Dungen and Verbeek, 1994, 1999:15). The (underlying) morphosyntactic form of an elliptical answer produced by children is partly dependent on the morphosyntactic form of the question asked by the interviewer (see 8.2.1 and 13.2).

In order to determine whether PI-children often produce incorrect clausal ellipsis instead of correct ones, firstly, the total number of clausal ellipsis (correct and incorrect forms) and secondly, the number of correctly formed clausal ellipsis is counted. We partly followed STAP that defines elliptical answers or clausal ellipsis according to three conditions for Dutch (Van den Dungen and Verbeek, 1994, 1999:15):

1. Elliptical answers are reactions to preceding (in)direct questions of the interviewer or the child.
2. The main predicate is absent, but this does not lead to ungrammaticality.
3. The missing parts of the clausal ellipsis can be extracted from the preceding question asked without causing ungrammaticality.

In order to produce a grammatical clausal ellipsis construction in Dutch all three conditions (1, 2 and 3) must be fulfilled\(^{12}\). The missing parts of a correct clausal ellipsis are often in sentence first position, since this position is generally occupied with information that is relatively old or less important (e.g. Haeseryn et al., 1997:1266).

Example 2 shows a grammatical clausal ellipsis construction that establishes cohesiveness in extended discourse as a reaction to a preceding question of the interviewer.

**Example 2**

<table>
<thead>
<tr>
<th>Interviewer:</th>
<th>Rudy:</th>
<th>Paraphrasis:</th>
</tr>
</thead>
<tbody>
<tr>
<td>hen, vertel eens heb jij broertjes of zusjes?</td>
<td>#1 een broertje.</td>
<td>[ik heb] een broertje.</td>
</tr>
<tr>
<td>(hi, tell me do you have brothers or sisters?)</td>
<td>#1-a-younger-brother.</td>
<td>(I have a younger brother).</td>
</tr>
<tr>
<td>(a little brother)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The category 'Clausal ellipsis' is used as an alternative for the category 'Elliptical answer' according to STAP (Van den Dungen and Verbeek, 1994, 1999:15).

\(^{11}\) Clausal ellipsis constructions that exist of single 'yes' and 'no' are not counted in the analysis (Van den Dungen and Verbeek, 1994, 1999:15).

\(^{12}\) 'he' in sentence-initial position in Dutch is a so-called 'attention-getter' to introduce a new topic (Hajtkens, 1997:198).
In Example 2, the missing elements in the clausal ellipsis construction, the subject 'ik' (I) and the predicate 'heb' (have) can be correctly extracted from the question of the interviewer without resulting in an ungrammatical and/or incohesive clause. According to STAP (Van den Dungen and Verbeek, 1994, 1999:15), if necessary information is not available in the question asked by the interviewer, such as the subject, the verb or the determiner (see Table 8.2), the elliptical answer is morphologically/syntactically marked: there is no one-to-one mapping of the underlying form of the answer to the form of the question asked (Examples 3 and 4).

Example 3  
Incorrectly formed clausal ellipsis: missing obligatory preposition in a PP (PI-child; age 6;3)

Interviewer:  
#2 en wonen jullie in een nieuw huis of niet?
(and do you live in a new house or not?)

Robert:
nee, Ø een ouw huis.
(no Ø an old house)

Paraphrasis:
nee, <in> een oud huis.
(no, in an old house)

In Example 3, the preposition 'in' (in) is not realized in the clausal ellipsis. Since the prepositional phrase is missing an obligatory element in its head position (see 6.2 and 7.4), the clausal ellipsis is morphosyntactically marked, according to STAP, although this is debatable.

Example 4  
Incorrectly formed clausal ellipsis: missing obligatory article with a noun (PI-child; age 4;7)

Interviewer:
en hebben jullie ook huisdieren?
(and do you also have pets?)

Priscilla:
Ø poes.
(Ø cat)

Paraphrasis:
<een> poes.
(<a> cat)

In Example 4, the obligatory determiner – an indefinite article – 'een' (a) is not realized in the noun phrase. Since the noun phrase is lacking an obligatory element in its head position, the clausal ellipsis is morphosyntactically incorrect. As shown in 7.4, PI-children show problems in establishing an agreement relation between the determiner and the noun that clearly negatively influences the production of grammatical clausal ellipsis.
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Table 8.2 An overview of examples of incorrect clausal ellipsis

<table>
<thead>
<tr>
<th>(In)correctly formed clausal ellipsis</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lexical categories</strong></td>
<td></td>
</tr>
<tr>
<td>Nominal phrase</td>
<td>Heb jij huisdieren? Ja, ik heb ⁰ / Ja, ⁰ heb ik (Do you have pets? Yes, I have ⁰ /Yes, ⁰ have I)</td>
</tr>
<tr>
<td>Verbal phrase</td>
<td>Heb jij broertjes of zusjes? Ik ⁰ een broertje (Do you have brothers or sisters? I ⁰ a brother)</td>
</tr>
<tr>
<td>Prepositional phrase</td>
<td>Wonen jullie in een nieuw huis? Nee, ⁰ ⁰ ⁰ een oud huis (Do you live in a new house? No, ⁰ ⁰ ⁰ an old house)</td>
</tr>
<tr>
<td>Adverbial phrase</td>
<td>Woon jij in een huis? Ja, ik woon ⁰ (Do you live in a house? Yes, I live ⁰)</td>
</tr>
<tr>
<td><strong>Functional categories</strong></td>
<td></td>
</tr>
<tr>
<td>Determiner (article)</td>
<td>Heb jij broertjes of zusjes? ⁰ broertje (Do you have brothers or sisters? ⁰ brother)</td>
</tr>
</tbody>
</table>

Furthermore, these morphosyntactically marked clausal ellipsis constructions cause not only ungrammaticality, but are frequently semantically/pragmatically marked, contain too little information and violate the maxim of quantity (Grice, 1975) (see 12.6). Incorrect clausal ellipsis causes incohesiveness in extended discourse (see 13.2). Here, the analysis of (in)correct clausal ellipsis is only based on identifying morphological/syntactic errors and does not involve semantic/pragmatic errors.

8.3.2 Results: Clausal Ellipsis

A subgroup of PI-children produces sentences with a short MLUw and MLULw for their age (see 8.2). We therefore might expect that some PI-children relatively tend to use clausal ellipsis more frequently. As is shown in Table 8.3, if the PI-children with slight problems and severe problems are taken together, the number falls within the normal limits when compared to 240 N-children from the STAP-population.

---

14 Note that the values according to the STAP guidelines are the total number of clausal ellipsis, i.e. the correct and incorrect forms (Van den Dungen and Verbeek, 1994, 1999).

15 Binomial test was used in PI-children to measure the differentiation in severe problems (z ≤ -2) and slight problems (-2 < z ≤ -1) on the variable Total number of forms with clausal Ellipsis according to the STAP-values (Van den Dungen and Verbeek, 1994, 1999).
(Van den Dungen and Verbeek, 1994, 1999). Most (93%) of all PI-children produce a number of clausal ellipsis constructions comparable to the N-children.

Table 8.3  Distribution of total number and percentage of 20 PI-children per age group and total number and percentage of 120 PI-children categorized according to z-scores z ≤ -2, -2 < z ≤ -1 and z > -1 on the variable clausal ellipsis in the conversational genre

<table>
<thead>
<tr>
<th>PI-children n=120</th>
<th>Clausal ellipsis</th>
</tr>
</thead>
<tbody>
<tr>
<td>z-scores</td>
<td>z ≤ -2</td>
</tr>
<tr>
<td>Normal distribution</td>
<td>2.3%</td>
</tr>
<tr>
<td>4yrs</td>
<td>0 0%</td>
</tr>
<tr>
<td>5yrs</td>
<td>0 0%</td>
</tr>
<tr>
<td>6yrs</td>
<td>0 0%</td>
</tr>
<tr>
<td>7yrs</td>
<td>0 0%</td>
</tr>
<tr>
<td>8yrs</td>
<td>0 0%</td>
</tr>
<tr>
<td>9yrs</td>
<td>0 0%</td>
</tr>
</tbody>
</table>

No significant difference is found either in the amount of clausal ellipsis produced by the PI-children compared to the N-children from the Roelofs-population (1998)\(^{16}\) (see Table 8.4). Only a significant age effect is found. The decrease in the use of clausal ellipsis can be explained as a significant linear trend in the N-children (F(4,70)=3.7114; p<.058; Eta squared .12; R squared .05)\(^{17}\) and as a linear development in the PI-children (F(5,114)=13.015; p<.000; Eta squared .12; R squared .10) (see Figure 8.3). Thus, older N- and PI-children seem to prefer to produce independent T-units instead of clausal ellipsis compared to younger N- and PI-children (see also 13.2). Table 8.4 also shows the development of correctly formed clausal ellipsis. Here, we see that the PI-children do produce significantly fewer correct constructions than the N-children (F(1,183)=96.638; p<.000)\(^{18}\).

\(^{16}\) ANOVA with Clausal ellipsis in general as dependent variable and age (4-5-6-7-8-9yrs) as independent variable is used in the N- and the PI-children. No significant group or interaction effect is found.

\(^{17}\) One-way ANOVA with Clausal ellipsis in general as dependent variable and age (4-5-6-7-8yrs) as independent variable is used in the N-children. One-way ANOVA with Clausal ellipsis in general as dependent variable and age (4-5-6-7-8-9yrs) as independent variable is used in the PI-children.

\(^{18}\) ANCOVA with Correct clausal ellipsis as dependent variable, total number of Clausal ellipsis as covariate and age (4-5-6-7-8-9yrs) as independent variable is used in the N- and the PI-children. No significant interaction effect is found.
The ability to package morphosyntactically: connectivity and transitivity

Table 8.4 Mean total number, percentage and standard deviations of total number of clausal ellipsis (in a sample of 50 T-units) and correct clausal ellipsis (related to total number of clausal ellipsis) in 75 N-children (Roelofs, 1998) and 120 PI-children in the conversational genre.

<table>
<thead>
<tr>
<th>Clausal ellipsis</th>
<th>N-children n=75</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td><strong>Total Ellipsis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4yrs</td>
<td>20.47</td>
<td>-</td>
</tr>
<tr>
<td>5yrs</td>
<td>13.20</td>
<td>-</td>
</tr>
<tr>
<td>6yrs</td>
<td>15.00</td>
<td>-</td>
</tr>
<tr>
<td>7yrs</td>
<td>12.40</td>
<td>-</td>
</tr>
<tr>
<td>8yrs</td>
<td>14.67</td>
<td>-</td>
</tr>
<tr>
<td>9yrs</td>
<td>15.15</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total mean</strong></td>
<td>15.15</td>
<td>-</td>
</tr>
<tr>
<td><strong>Correct Ellipsis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4yrs</td>
<td>18.73</td>
<td>91.5%</td>
</tr>
<tr>
<td>5yrs</td>
<td>12.13</td>
<td>91.9%</td>
</tr>
<tr>
<td>6yrs</td>
<td>14.00</td>
<td>93.3%</td>
</tr>
<tr>
<td>7yrs</td>
<td>11.73</td>
<td>94.6%</td>
</tr>
<tr>
<td>8yrs</td>
<td>14.33</td>
<td>97.7%</td>
</tr>
<tr>
<td>9yrs</td>
<td>14.19</td>
<td>93.8%</td>
</tr>
<tr>
<td><strong>Total mean</strong></td>
<td>14.19</td>
<td>93.8%</td>
</tr>
</tbody>
</table>

A significant age effect is found that cannot be explained as a linear increase in the N-children; the PI-children, however, do show a clear linear increase with age in the amount of correct clausal ellipsis (F(5,114) = 7.749; p<.006; Eta squared .08; R squared .06)19 (Figure 8.3). However, we see that the PI-children lag behind in their performance when compared to the N-children: the nine-year-old PI-children produce even fewer morphologically/syntactically correct clausal ellipsis constructions than the four-year-old N-children. Despite the increase of morphologically/syntactically correct clausal ellipsis, these constructions can still be semantically/pragmatically incorrect (see 13.2).

19 One-way ANCOVA with Correct clausal ellipsis as dependent variable, total number of Clausal ellipsis as covariate and age (4-5-6-7-8-9yrs) as independent variable is used in the PI-children.
8.3.3 Conclusion: Clausal Ellipsis
The PI-children produce the same number of clausal ellipsis constructions as the N-children from the STAP and the Roelofs-population. If the clausal ellipsis is morphologically/syntactically correct, children are able to achieve information exchange in a condensed, efficient and cohesive manner. The morphological/syntactic correctness of clausal ellipsis is a prerequisite for the semantically/pragmatically correct use of clausal ellipsis (see also 13.2). However, PI-children produce significantly fewer correctly formed clausal ellipsis constructions compared to the N-children from the Roelofs-population (Roelofs, 1998). Probably, their delay in acquiring grammatical rules, for example identifying the kernel sentence frame (the verb and its arguments) and identifying the boundaries of a noun phrase, can partly explain this deficiency (see 5.2 to 5.4). PI-children especially have difficulties in explicating the functional head within a noun phrase and a prepositional phrase, covering articles and prepositions.

8.4 Connectivity by the use of Conjunction Reduction Constructions
8.4.1 Research questions, definitions and operationalisations
With the use of syntactic conjunction it is possible to establish connectivity in the conversational interview: two clauses are tied together more closely and explicitly (Berman and Slobin, 1994). This can be done by producing a main clause and a reduced clause that are both connected with a coordinated conjunction, such as 'en' (and) or 'of' (or). If the nominal element is reduced in the reduced clause, this is called nominal gapping. If the verbal part is reduced, this is called verb gapping (see 8.2.1). With the use of correct conjunction reduction construction or gapping two clauses are grammatically connected, resulting in cohesive information exchange in extended discourse (Ross, 1967; Root, 1992; Heim, 1993, 1995; Haeseryn et al., 1997:1557) (13.3).
There is very little research on how young normally developing Dutch-speaking children use different clause types. At first the utterances are simple, and consist of
just one verbal element and its arguments, that is one clause. When Dutch-speaking children are 2;6 year old, they start to use dependency relations: children produce multi-clausal utterances with coordinating conjunctions as connector (Bol and Kuiken, 1988:57). Around the age of three, children start to express subordinate conjunctions in multi-clausal utterances (Bol and Kuiken, 1988; De Houwer, 1990).

Several developmental steps have to be taken before a child can make a grammatical conjunction reduction construction. Normally developing children must first learn to use semantically correct coordinate conjunctions to connect two main clauses. Second, children have to learn which grammatical information is redundant and can be left implicit, such as the subject or the verb. Length considerations appear not to be quite so limiting once Dutch-speaking children are four years old. However, the range of clause types and sentence constituents that children use is still very restricted compared to those of adults.

This section addresses the questions whether the PI-children produce the same number of correct conjunction reduction constructions or gapping constructions compared to the N-children in the conversational interview. And, is there a comparable development with age?

We restrict our analysis of conjunction reduction to an analysis at sentence level, not including conjunction reduction constructions on word or constituent level. At sentence level, in conjunction reduction constructions an obligatory coordinate conjunction needs to be produced in order to conjoin two or more clauses, of which one is reduced. All different types of linguistic elements can be eliminated in the reduced clause(s).

What can be left implicit in the reduced clause are the joined elements that are identical in form, meaning and grammatical function (Haeseryn et al., 1997:1582) (Example 5).

**Example 5**

Correctly formed conjunction reduction (PI-child; age 8;2)

Jorg:

en die heeft een soort zwarte streep over zijn rug en een heel klein staartje.
and that has a sort of black stripe on his back and a really little tail.

Paraphrasis:

en die heeft een soort zwarte streep over zijn rug en [die heeft] een heel klein staartje.
and that has a sort of black stripe on his back and [he has] a really little tail.

In Example 5, the subject 'die' (that) and the predicate 'heeft' (has) of the first conjunct (clause) are correctly missing in the second conjunct (clause). An important exception to the rule of identical form concerns the verbal predicate. A verbal predicate can also be reduced, when there is a form difference in number and/or person agreement between two predicates (Haeseryn et al., 1997) (Example 6).

---

20 The paraphrasis consists of the full grammatical form.
Example 6  

Fictive example of a conjunction reduction with difference in number in the reduced verbal predicate in the second conjunct

Adult:  

Jullie komen meteen en ik Ø morgen  
(You (plural) are coming now and I (singular) Ø tomorrow)

Paraphrasis:  

Jullie komen meteen en ik [kom] morgen  
(You (plural) are coming now and I (singular) [am coming] tomorrow)

In Example 6, the verbal predicate in the first conjunct is the plural form that agrees with the plural subject, whereas in the second conjunct the reduced verbal predicate is the singular form that agrees with the singular subject.

There are two directions in which conjunction reduction can occur with nominal, verbal and other elements. For example, if the dropped NP is part of the second conjunct (i.e. conjoined clause), this is referred to as forward conjunction reduction. This is the most common used form of conjunction reduction in Dutch (Lust, 1976; Broekhuis, 1994; Haeseryn et al., 1997:1584). In a sense the subject of the first conjunct of forward conjunction reduction constructions acts as the subject of both the first and the second conjunct. A referentially dependent NP must have a commanding antecedent according to the binding theory in generative grammar. If the dropped NP is part of the first conjunct (i.e. conjoined clause), this is referred to as backward conjunction reduction. In the backward conjunction reduction construction, a certain phrase in the first conjunct is deleted under the conditions of referential 'identity' with a phrase in the second conjunct (Lust, 1976; Broekhuis, 1994; Haeseryn et al., 1997:1584).

To determine the rate at which conjunction reduction occurs, the total number of conjunction reduction constructions within 50 T-units is identified. Thereafter, we determined the rate of incorrect conjunction reduction constructions, calculated over the total number of (correct and incorrect) conjunction reduction constructions. Obviously, if a certain phrase in the first conjunct of the reduced T-unit is deleted incorrectly with a phrase in the second conjunct and vice versa, the T-unit is morphologically/syntactically marked. An incorrectly formed conjunction reduction contributes to the ungrammaticality of the T-unit21 (Example 7).

Example 7  

Incorrectly formed conjunction reduction (PI-child; age 6:3)

Robert:  

en dan ga ik met Frank ook buiten spelen Ø met Daniel ook.  
(and then I go play outside also with Frank Ø also with Daniel)

21 In Example 7 (first T-unit) the intonation contour dropped after the adverb 'ook' (also), indicating the end of a T-unit according to STAP (Van den Dungen and Verbeek, 1994, 1999). The constituent 'met Daniel ook' (with Daniel also) is thus included in the T-unit. Also the absence of a pause of 1 second or more as substitution for the conjunction motivates this segmentation.
The ability to package morphosyntactically: connectivity and transitivity

Paraphrasis: en dan ga ik met Frank buiten spelen <en> met Daniel ook. (and then I go play outside with Frank <and> also with Daniel)

In Example 7, the obligatory coordinate conjunction 'en' (and) to connect the two clauses is missing; therefore the conjunction reduction construction is ungrammatical.

8.4.2 Results: Conjunction Reduction Constructions
We found no significant difference between the N- and the PI-children with respect to the total number of conjunction reduction constructions (Table 8.5).

Table 8.5 Mean total number, percentage and standard deviations of total number of conjunction reduction constructions (related to 50 T-units) and correctly formed conjunction reduction constructions (related to total number of conjunction reductions) in 45 N-children and 60 PI-children in the conversational genre

<table>
<thead>
<tr>
<th>Conjunction Reduction Construction</th>
<th>N-children n=45</th>
<th>PI-children n=60</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>Total forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4yrs</td>
<td>2.27</td>
<td>4.5%</td>
</tr>
<tr>
<td>6yrs</td>
<td>2.40</td>
<td>4.8%</td>
</tr>
<tr>
<td>8yrs</td>
<td>2.27</td>
<td>4.5%</td>
</tr>
<tr>
<td>Total mean</td>
<td>2.31</td>
<td>4.6%</td>
</tr>
<tr>
<td>Correctly formed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4yrs</td>
<td>1.80</td>
<td>79.3%</td>
</tr>
<tr>
<td>6yrs</td>
<td>1.80</td>
<td>75.0%</td>
</tr>
<tr>
<td>8yrs</td>
<td>1.73</td>
<td>76.2%</td>
</tr>
<tr>
<td>Total mean</td>
<td>1.78</td>
<td>76.8%</td>
</tr>
</tbody>
</table>

Surprisingly, the six-year-old PI- and N-children most frequently use conjunction reduction. PI-children as a group also produce even more complex clauses with conjunction reduction compared to the N-children, probably due to the tendency found in PI-children to leave linguistic information implicit (see 5.2 to 5.7). When we look at the correctly formed conjunction reductions, however, we see that PI-children have significantly fewer correct conjunction reduction constructions than the N-children (F(1,98)=9.105; p<.003) (see Figure 8.4). With age we see that the

22 ANOVA with Conjunction reduction constructions in general as dependent variable and age (4-6-8yrs) as independent variable is used in the N- and the PI-children. No significant age or interaction effect is found between the two groups of children.

23 ANCOVA with Correct conjunction reduction constructions as dependent variable, Conjunction reduction constructions in general as covariate and age (4-6-8yrs) as independent variable is used in
N-children show no clear development with age, whereas the PI-children slightly improve with age, although not significantly.

**Figure 8.4** Percentage correctly formed conjunction reduction constructions in 45 N-children and 60 PI-children in the conversational genre

![Percentage correctly formed conjunction reduction constructions in 45 N-children and 60 PI-children in the conversational genre](image)

Although the PI-children improve with age, the oldest PI-children do not even reach the level of linguistic complexity observed in the youngest N-children.

**8.4.3 Conclusion: Conjunction Reduction Constructions**

Although PI-children produce conjunction reduction constructions as frequently as the same-aged N-children, the PI-children make significantly more incorrectly formed constructions, especially the four-year-olds. For example, they frequently erroneously omit the obligatory coordinate conjunction 'en' (and) between clauses, a linkage element to establish cohesiveness. They also often express adverbs of place and time in sentence-first position of the reduced clause, although this position is reserved for the empty category in order to produce a correct conjunction reduction construction. This type of error was also frequently observed in non-complex T-units (see 6.3). Probably their problems with using grammatical rules, for example difficulties in explicating the functional head-category complementizer, can partly explain the incorrectly formed conjunction reductions.
8.5 Connectivity by the use of Embedded Clauses

8.5.1 Research questions, definitions and operationalisations
As is the case for conjunction reduction (see 8.4), the use of embedded clauses also creates connectivity in the interview (Berman and Slobin, 1994) (see also 13.3). The category embedded clauses consists of (1) subordinated clauses connected to a main clause or (2) relative clauses connected to a noun phrase. Embedded clauses are a means of packaging information structurally, hierarchically and cohesively.

In Dutch, as in German, word order in subordinate and relative clauses can be considered 'more complex' than the verb-second order in main clauses (Haegeman, 1991). The order of main clauses is variable, but subordinate clauses require an obligatory subordinate conjunction in sentence-initial position and final placement of the finite verb. Relative clauses also require a sentence-initial grammatical conjunction and a verb-final placement, governed by a noun phrase (NP) (Haeseryn et al, 1997:1379). In Dutch, relative clauses are right-branching, that is, they are placed after the head noun. Parallel Function Hypothesis (Sheldon, 1974) (same function of the head noun in the main and in the relative clause) has a positive influence on comprehension of relative clause constructions: the complexity of a sentence depends on the grammatical function of the head noun and this is a language-independent phenomenon (Aarssen, 1996).

At the age of three years Dutch-speaking children start to use compound utterances with coordinate conjunctions, followed by subordinate conjunctions in complex utterances (Bol and Kuiken, 1988; De Houwer, 1990). The first subordinate clauses that appear are temporal and conditional clauses, followed by causative clauses. Relative clauses appear after the age of four with increasing frequency (Van Ierland, 1979, 1980).

The comprehension and production of subordination, more precisely relative clauses, was investigated in Swedish-speaking SLI-children (Hakansson and Hansson, 2000). On the comprehension tasks, children with SLI did not differ significantly from the unimpaired children. However, on the production tasks, the SLI-children had significantly more responses where they did not insert the relative pronoun in complementizer position in relative clauses. The results indicate that the relationship between comprehension and production is different at different stages in development (see 1.2). What is more, SLI-children seem to have particular difficulty with sentence structures that involve dependency relations, as is also found in children with Williams' Syndrome who show clear difficulties in understanding embedded sentences (Karmiloff-Smith et al., 1997).

The number of clauses packaged together will increase as children grow older, as well as the diversity of types of inter-clause connections, although this is still very restricted in comparison to adults. The most difficult type of complex clause to acquire is the relative clause. Even nine-year-old children frequently use structurally ill-formed relative clauses, due to the pressure of online processing of the internal structure of relative clause constructions and organization of information (Berman and Slobin, 1994:321).
This section addresses the questions whether PI-children use the same number of correctly formed embedded clauses compared to the N-children in the conversational interview. And, is there a comparable development with age?

In order to determine the rate at which embedded clauses occur, the total number of embedded clauses within 50 T-units is counted. According to the guidelines of STAP, the T-units with direct speech are not included in the total number of embedded clauses (Van den Dungen and Verbeek, 1994, 1999). In the context of direct speech neither a subordinate conjunction nor verb-finite order are obligatory. This implies that they are less difficult for children to learn than fully embedded clauses. Example 8 shows a correctly formed embedded clause, whereas Example 9 is an example of a morphologically/syntactically incorrect embedded clause.

**Example 8**

Correctly formed embedded clause: subordination (PI-child; age 8;11)

Robert:  
'en de tweede keer toen we gingen viel dat schip bijna om.'  
(and the second time when we went fell that ship almost over.)

In Example 8, the subordinate clause is realized with the subordinate conjunction 'toen' (then) and a verb-final order.

**Example 9**

Incorrectly formed embedded clause: subordination (PI-child; age 4;8)

Jeroen:  
'want als ik wel eens ziek # dan ga ik haar aaien.'  
(so if I sometimes ill # then go I her stroke.)  
(and if I am ill sometimes I do stroke her)

Paraphrase:  
'want als ik wel eens ziek # dan ga ik haar aaien.'  
(so if I sometimes ill # then go I her stroke.)  
(and if I am ill sometimes then I do stroke her)

In the subordinate clause in Example 9 the subordinate conjunction 'als' (if) is correctly realized, but the obligatory verb final position is left empty: the verbal element 'ben' (am) should have been expressed.

8.5.2 Results: Embedded Clauses

Table 8.6 shows the total number of embedded clauses used by the N- and PI-children. Similarly to the use of conjunction reduced clauses, we found no significant difference in the production of embedded clauses between the N- and the PI-children. On average the N- and PI-children produce 5 embedded clauses within 50 T-units. Comparing the PI-children to the N-children from the STAP-population who

---

24 ANOVA with Subordinations in general as dependent variable and age (4-6-8yrs) as independent variable is used in the N- and the PI-children. No significant interaction-effect is found between the two groups.
produce on average 4 embedded clauses within 50 T-units, the PI-children perform even better (see Appendix 8c). This finding confirms that PI-children try at least as often as the N-children (from both populations) to produce embedded clauses.

Table 8.6
Mean total number, percentage (related to 50 T-units) and standard deviations of embedded clauses and mean total number, percentage (related to total number of embedded clauses) and standard deviations of correctly formed embedded clauses in 45 N-children and 60 PI-children in the conversational genre

<table>
<thead>
<tr>
<th>Embedded clauses</th>
<th>N-children n=45</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>PI-children n=60</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
<td>sd</td>
<td>x</td>
<td>%</td>
<td>sd</td>
<td></td>
<td>x</td>
<td>%</td>
<td>sd</td>
<td></td>
</tr>
<tr>
<td>Total forms</td>
<td>4yrs</td>
<td>3.27</td>
<td>6.5%</td>
<td>2.58</td>
<td>3.35</td>
<td>6.7%</td>
<td>2.39</td>
<td>2.04</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5yrs</td>
<td>-</td>
<td>-</td>
<td>4.05</td>
<td>8.1%</td>
<td>2.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6yrs</td>
<td>6.20</td>
<td>12.4%</td>
<td>5.55</td>
<td>11.1%</td>
<td>3.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7yrs</td>
<td>-</td>
<td>-</td>
<td>5.00</td>
<td>10.0%</td>
<td>2.70</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8yrs</td>
<td>4.60</td>
<td>9.2%</td>
<td>4.50</td>
<td>9.0%</td>
<td>2.67</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9yrs</td>
<td>-</td>
<td>-</td>
<td>6.40</td>
<td>12.8%</td>
<td>4.12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total mean</td>
<td>4.69</td>
<td>9.4%</td>
<td>2.72</td>
<td>4.81</td>
<td>9.62%</td>
<td>3.81</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correctly formed</td>
<td>4yrs</td>
<td>2.80</td>
<td>85.6%</td>
<td>2.34</td>
<td>1.35</td>
<td>40.3%</td>
<td>1.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5yrs</td>
<td>-</td>
<td>-</td>
<td>2.20</td>
<td>54.3%</td>
<td>1.74</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6yrs</td>
<td>5.27</td>
<td>85.0%</td>
<td>2.40</td>
<td>2.75</td>
<td>49.5%</td>
<td>2.90</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>7yrs</td>
<td>-</td>
<td>-</td>
<td>2.55</td>
<td>51.0%</td>
<td>1.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8yrs</td>
<td>3.67</td>
<td>79.8%</td>
<td>2.16</td>
<td>2.80</td>
<td>62.2%</td>
<td>1.85</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>9yrs</td>
<td>-</td>
<td>-</td>
<td>4.05</td>
<td>63.3%</td>
<td>2.93</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total mean</td>
<td>3.91</td>
<td>86.4%</td>
<td>2.48</td>
<td>2.62</td>
<td>53.4%</td>
<td>2.24</td>
<td></td>
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</tr>
</tbody>
</table>

A significant age effect is found, but it cannot be fully explained as a linear relation (F(8,165)= 4.592; p<.001), since the 6-year-olds in both groups show a higher amount of embedded clauses than expected. Similar results were found with the use of conjunction reductions in six-year-old N- and PI-children. An explanation could be that the six-year-old N-children from the Roelofs-population are relatively more explicit than the younger and older N-children, due to an acceleration in social-cognitive growth stimulated by their acquisition of the ability to read and write, approximately starting at age six (Roelofs, 1998:144). A similar developmental growth spurt seems to exist in the PI-children: learning how to read and write positively influences the morphological/syntactic spell-out rules.

When we look at the proportion of correctly formed embedded clauses (Table 8.6), we see that the PI-children produce significantly fewer correct embedded clauses than the N-children (F(9,165)=21.090; p<.000)25. This is also shown in Figure 8.5.

25 ANCOVA with Correct subordinations as dependent variable, Subordinations in general as covariate and age (4-6-8yrs) as independent variable is used in the N- and the PI-children. No significant age and interaction effect is found between the two groups of children.
The most obvious and significant error PI-children make in producing embedded clauses is the omission of the subordinated conjunction ($F(1,98)=5.332; p<.023$).26 Probably their problems in acquiring grammatical rules, for example difficulties in explicating the functional head-category complementizer (see also 8.4), can partly explain the incorrectly formed embedded clauses. The N-children almost always fill this complementizer position with a subjunction to connect the main clause to the dependent clause. Errors with the realization of arguments with the verb or with the verb-finite word order in the embedded part of the T-unit also frequently occurred in PI-children as might be expected from earlier results (see 5.2 to 5.4; see 6.4). These types of errors also lead to incorrect embedded clauses.

Contrary to our expectations, the six-year-old N-children produce again relatively more correctly embedded clauses than the eight-year-olds. We cannot explain this high number of complex clauses in the six-year-old N-children, except for the fact that this age group is said to be the most explicit (Roelofs, 1998:144). With respect to the occurrence of different types of embedded clauses, we found no significant differences in the occurrence of relative clauses subordinated to a noun or embedded clauses at sentence level in both groups.27 The fact that no group effect was found is probably due to the low number of embedded clauses of these types in the conversational interview. As explained in 8.5.1, direct speech as another type of complex sentence structure is not included in the total number of subordinate clauses. It could be the case that this type is easier than an embedded structure with a subordinating conjunction and a verb-finite word order. However, no significant difference was found in the total number of T-units with direct speech comparing

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26 ANCOVA with Missing subordinated conjunctions as dependent variable, Total number of subordination errors as covariate and age (4-6-8yrs) as independent variable is used in the N- and PI-children. No significant age and interaction effect is found between the two groups of children.

27 ANCOVA with Relative clause as dependent variable, Total number of subordinations as covariate and age (4-6-8yrs) as independent variable is used in the N- and PI-children. No significant main effect is found between the two groups of children.
both N- and PI-children. Possibly, we will find substantial differences in the comparison of the conversational with the narrative genre, since the Frog story offers more opportunity to produce direct speech during narrating of the plot (see Chapters 9 and 14).

8.5.3 Conclusion: Embedded Clauses
PI-children produce embedded clauses as frequently as N-children, but the PI-children have significantly fewer correctly formed structures, indicating real problems in producing hierarchically linked clauses to express multiple ideas. Particularly, PI-children show more problems than N-children in the use of subordinated conjunctions to package clauses in more complex morphological/syntactic units and in the verb final word order. Probably their problems in acquiring grammatical rules, for example difficulties in explicating the specifier position of the functional head-category complementizer, can partly explain the differences. Finally, we found that PI-children do not have a preference for a particular type of embedded clause, such as sentences with direct speech, where the specification of the dependency relation (i.e. the complementizer) is absent and a less complex embedded structure is necessary.

8.6 Transitivity of Verbs

8.6.1 Research questions, definitions and operationalisations
Verbs involve the participation of more than one referent in a semantic scenario (Haegeman, 1991) and they also package different meaning elements, for example manner as well as direction of motion (Gentner, 1982). As in English, Dutch verbs behave differently according to their semantic functionality. Thematic roles or arguments are mapped from the lexicon onto syntactic positions. There is no agreement in the literature on the exact number and kind of thematic roles, although it is a limited set: e.g. Agent, Experiencer, Goal, Beneficiary, Source, Location, Patient and Theme (e.g. Dik, 1989). Williams (1981) distinguished two types of arguments: internal arguments are projected in the syntax in a position close to the verb (inside the VP); external arguments are projected in the syntax outside the VP (for examples see 5.4). A set of thematic relations maps onto (a smaller set) of argument-structural positions, that in turn map onto syntactic relations such as subject or object (Chomsky, 1981).

28 ANOVA with Direct speech as dependent variable and age (4-6-8yrs) as independent variable is used in the N- and PI-children. No significant main effect is found.
Chapter 8 Morphological/Syntactic conversational development

The general picture is as follows:

- Thematic (semantic) relations (e.g. *agent*)
- Argument structure (external argument)
- Syntactic relations (e.g. *subject*)

Which group of verbs (transitive, ditransitive or intransitive) a verb belongs to is treated as an idiosyncratic property of the verb (Haegeman, 1991) (see also 5.4). If the Verb Phrase (VP) has a transitive verb as its head, the verb takes an object complement. A VP with a ditransitive verb as its head requires a direct and an indirect object. If a VP contains an intransitive verb as its head, then no direct object is allowed. A VP with a copula verb allows no object complement at all. Copula verbs express the verbal part in a nominal predicate and are therefore connectors between the subject and mostly a nominal or adjectival phrase, as for example in 'Jeroen is ziek' (Jeroen (proper name) is ill) (Haeseryn et al., 1997:946).

In the following we will discuss the difference between transitive verbs that allow objects to be missing and verbs that do not. Three factors may cause obligatory transitivity: inherent telicity, delimited predicates with obligatory PP's, and the relative meaninglessness of the verb (Krämer, 1995).

According to Krämer (1995), the combined factors of verb meaning and pragmatics determine whether a verb is an obligatory transitive. Firstly, syntactic obligatoriness of an object complement is determined by the aspect of the proposition. If there is an event-predicate (perfective aspect), an object must be present. If there is a non-event predicate (imperfective aspect), objects are optional.

Secondly, pragmatic obligatoriness is determined by the information that an utterance must minimally contain. Pragmatics determines whether a verb can be used without an object and still be meaningful. This is especially important when there is no event-predicate. An object may then be needed to clarify or specify the meaning of the verb (see 12.6 and 12.7).

Children have to learn for each verb the number of arguments that it takes, and the position of each argument in the argument structure. In addition, most verbs may surface in more than one argument structure, a phenomenon often referred to as lexical syntactic flexibility. With regard to the acquisition of the internal arguments, there is an important question to be asked: how do children proceed in determining which lexical verbs take objects obligatorily or optionally and which lexical verbs do not?

There are basically two ways of looking at children's acquisition of argument structure. On the one hand, the child is thought to take the semantic roles as cues for learning syntactic categories, also called 'semantic bootstrapping' (e.g. Pinker, 1989a et passim). On the other hand, Landau and Gleitman (1985) found evidence for 'syntactic bootstrapping': the child is thought to use the syntactic categories as a framework for interpreting thematic roles (see also 2.3.2). Probably, both strategies in learning argument structures are working simultaneously.
Lexical verbs that take obligatory object complements are considered to be more complex than verbs that do not. Therefore, we will investigate whether PI-children use the same number of **obligatory** and **optional object verbs** compared to N-children in the conversational interview. And, is there a development with age? The use of verb frames with (obligatory or optional) object complements are more complex to produce than verb frames without direct object complements, such as intransitive verbs, or copula verbs with no object complements at all. Therefore, we also address the question whether PI-children produce the same number of **intransitive and copula verbs** than N-children in the conversational interview. And, is there a comparable development with age?

The lexical verbs that subcategorize for at least one obligatory object complement are analysed as **obligatory object verbs**, as also defined and illustrated in 5.4 (Haeseryn et al., 1997:50). The lexical verbs that could be used without an obligatory object are analysed as **optional object verbs**. Lexical verbs that can never take a direct object are categorized as **intransitive verbs**. Finally, **copula verbs** are analysed that take no object complements at all (see 5.4).

### 8.6.2 Results: Transitivity of Verbs

First, the results are shown with respect to the different type of verbs in isolation. Second, an overview of the different verb forms used in the conversational interview is presented. We found no significant difference in the production of obligatory object verbs that need a complex argument structure in the PI- and the N-children. ANCOVA with Obligatory object verbs as dependent variable, T-units with a realized verb as covariate and age (4-6-8yrs) as independent variable is used in the N- and PI-children. No significant group, age or interaction-effect are found between the two groups.
Thus, PI-children produce as many complex verb-frames of this type as the same-aged N-children, although we already know from 5.3 and 5.4 that PI-children leave obligatory arguments implicit too often. Unexpectedly, the N-children do not show a clear developmental increase with age in the production of the most complex verb forms that take an obligatory complement. The use of an optional object verb gives the opportunity to leave the object implicit and therefore optional object verbs are considered to be less complex morphosyntactic verb frames than obligatory object verbs. The missing optional objects do not cause ungrammaticality. Again, no significant difference is found: PI-children produce similar numbers of optional object verbs to the same-aged N-children \(^{30}\) (see Figure 8.7; Appendix 8e). Again, the expected decrease with age in the production of the optional object verbs is not substantial in either the PI- or the N-children.

![Figure 8.7](image)

**Figure 8.7** Development with age of the number of optional object verbs (related to T-units with a realized verb) in 45 N-children and 120 PI-children in the conversational genre

Intransitive verbs are verbs that do not take a direct object and therefore depress the length and complexity of the utterance (see 5.3.4 and 8.6.1), but no significant difference in the production of intransitive verbs is found between the N- and the PI-children \(^{31}\). PI-children do not rely more often on a less complex argument structure built with an intransitive verb than the N-children (Figure 8.8; Appendix 8f). Also no development with age is found in the use of intransitives in both N- and PI-children.

\(^{30}\) ANCOVA with Optional object verbs as dependent variable, T-units with a realized verb as covariate and age (4-6-8yrs) as independent variable is used in the N- and PI-children. No significant group, age or interaction-effect are found between the two groups.

\(^{31}\) ANCOVA with Intransitive verbs as dependent variable, T-units with a realized verb as covariate and age (4-6-8yrs) as independent variable is used in the N- and PI-children. No significant group, age or interaction-effect is found.
Finally, the use of copula verbs is presented. These verbs take no object complements at all and therefore also restrict utterance length and complexity (see 5.3.4 and 8.6.1). PI-children do use significantly more copula verbs compared to N-children (F(6,105)=9.357; p<.003)\textsuperscript{32}, especially the five and eight-year-old PI-children (see Figure 8.9; Appendix 8g).

However, the effect of the production of copula verb constructions is apparently not strong enough to influence the MLU\textsubscript{w} and MLUL\textsubscript{w} of the PI-children negatively (see 8.2). They frequently fill in (stereotypic) adverbial phrases (see 6.3) and interjections or minors that were not included in the detailed analysis, but do count as words for the MLU\textsubscript{w} and MLUL\textsubscript{w} counts. We conclude that PI-children only differ from N-children in the production of copula verbs with an objectless verb frame.

\textsuperscript{32} ANCOVA with Copula verbs as dependent variable, T-units with a realized verb as covariate and age (4-6-8yrs) as independent variable is used in the N- and PI-children. No significant age or interaction-effect is found between the two groups.
Finally, Figure 8.10 shows the distribution of all the verb types together in both N- and PI-children. The most frequently used verb class as predicate in both groups of children is the category obligatory object verbs (43% in the N-children and 41% in the PI-children). We found a significant difference between the two groups of children in the distribution of the different verb types used ($F(3,153)=3.344; p<.021$), mainly caused by the difference in the use of copula verbs.

8.6.3 Conclusion: Transitivity of Verbs

PI-children are able to produce complex verb frames that require (obligatory) objects as frequently as N-children, although PI-children show significantly more missing obligatory objects than N-children (see 5.3.4). So the production of these obligatorily transitive-verb-frames often causes ungrammaticality (see also 8.7). With respect to the production of verb frames that do not take direct object complements or no object complements at all, PI-children significantly use more predicates with a copula than N-children. Overall, PI-children differ significantly with regard to the distribution of the verb types compared to N-children, since the PI-children (42.2%) show a slight preference for verb frames that do not take a direct object complement or that do not have such a complement at all compared to the N-children (37.2%).

33 MANCOVA with Obligatory object verbs, Optional object verbs, Intransitive verbs and Copula verbs as dependent variables, T-units with a finite verb as covariate and age as independent variable in the N-children (4-6-8yrs) and PI-children (4-5-6-7-8-9yrs) is used. No age effect is found.
8.7 Transitivity by the use of Split and Light Verbs

8.7.1 Research questions, definitions and operationalisations

In the literature it has been suggested that in Dutch two types of verbs are less complex than other verbs: the split or particle verbs (Krämer, 1995; Van Hout, 1996) and the light or General All Purpose (GAP) verbs (Rice, 1991). The main purpose of this section is to determine whether PI-children rely more frequently on the relatively less complex split verbs and light verbs that both semantically trigger an object complement.

First, in Dutch, as in German, split verbs involve prefixation as a productive morphological means to change the Aktionsart (inherent semantic meaning) of the verb (Klein, 1992). The addition of a particle to an activity verb often results in a shift in the event structure of a verb (Hoekstra, 1992; Tenny, 1994; Van Hout, 1996), indicating the presence of an endpoint, i.e. a telic event. For example, the addition of specific particles transforms activity verbs, such as the verb 'rijden' (to drive) into the telic verb 'uitrijden' (drive out). The sentential order of split verbs can be seen as verb-particle constructions consisting of a lexical verbal part and a particle in sentence-final position, for example 'hij schrijf de brief aJ (he writes the letter out). When the particle 'aJ is not present, the activity may be ongoing. By using the particle 'aJ, the activity has an inherent endpoint. Although verbs have inherent (a)telic properties, it is in the interaction of the verb and its arguments, that (a)telicity of a situation is established (Verkuyl, 1972; Comrie, 1976; Dowty, 1979; Brinton, 1988)34. Additionally, split verbs occur in telic or atelic clauses, depending on the use of particular particles.

The linguistic status of particles is disputed. Either, in the case of a verb-particle construction, the particle is retrieved from the lexicon together with the verb root (e.g. Neeleman and Weerman, 1993, Booij, 1996, 1998; Haeseryn et al., 1997:451; De Jong, 1999) or the particle can be seen as independent of the verb root (Bennis, Dikken, Jordens and Weissenborn, 1995). If a split verb is used, the particle stands for a full PP. Linguistically, it is not clear whether the production of a particle is less complex than the production of a PP. Particles like 'op' (up) and 'weg' (off) are used at the one-word stage, and in early multi-word stage, when children do not yet use prepositional phrases (Brown, 1973). Around the age of three years verb plus particle combinations are acquired (Verhulst-Schlichting, 1987) as opposed to verb plus prepositional phrases. The first occurrence of split verbs is very close in time to the appearance of complex predicates consisting of an auxiliary and a main verb (Wijnen, 1993). An explanation is that particles can be attached to bare verbs to

34 "Aspects are different ways of viewing the internal temporal constituency of a situation" (Comrie, 1976:3). Following Comrie's notion of 'aspect' there are two separate concepts: (im)perfectivity and (a)telicity. A perfective aspect indicates the view of a situation as a single whole, without distinction of the various phases that make up the situation; an imperfective aspect pays essential attention to the internal structure of a situation (Comrie, 1976:16). This is often called a grammatical or morphological aspect, whereas the telic-atelic distinction is called a semantic aspectual distinction, because it refers to the inherent aspeclual value of a situation.
provide semantic information about aspect and directionality, whereas prepositions are essentially relational elements, connecting verbs to the argument or adjunct nominals associated with them within the clause.

Since split verbs represent telic events, Krämer (1995) suggested that young Dutch-speaking children (aged 1;8 to 3;1 year) should show less object drop with the use of these verbs. The results of Thrift (2003) in Dutch-speaking children (aged 1;8 to 3;2 year), however, show the opposite, namely that objects are dropped with telic verbs far more than with atelic verbs: 37% of the split verbs undergo object drop compared to 23% of the non-split verbs. However, when normally developing children of three years of age start to recognize that determiners have to be explicates as head of the noun phrase in Dutch and when determiners begin to appear consistently, object drop with telic split verbs decreases substantially to 8%. Thrift (2003) claims that reduction in object drop rates and the acquisition of the determiner system seem to co-occur in the acquisition of Dutch. According to De Jong (1999), Dutch-speaking SLI-children prefer to use split verbs with explicit particles instead of full PP's. SLI-children favour a relatively less 'complex' expression of argument structure over a relatively more complex one: they frequently erroneously omit the oblique argument and sometimes substitute it with a particle related to the split verb. This would imply a preference for the expression of theme over the expression of goal. Unfortunately, whether Dutch-speaking SLI-children use less object drop with split verbs was not analysed.

The role of aspect also shows up in the acquisition of light or GAP verbs. Van Hout (1996) characterizes these verbs as purely aspectual: the only function of the verb is to signal a certain event type. Light verbs have very little meaning and therefore need the explicitation of internal arguments. The relative meaninglessness of the verb is the cause of obligatory transitivity: the verb needs an object to carry sufficient information in order to be morphologically/syntactically and semantically/pragmatically appropriate.

Children produce light verbs frequently and they appear early. Children make up their own light-verb-constructions (Van Hout, 1996). Another interesting finding is that if children make a verb-choice error in a light-verb-construction, they choose a verb, which expresses the same event type as the target form. For example, they may choose causative 'maken' (to make) instead of causative 'doen' (to do) or vice versa, but they will not choose inchoative 'gaan' (to go) in a causative context.

The argument structure of light verbs seems to be multifunctional compared to that of more specific verbs. Children are learning the argument structures of more specific verbs by resorting to multifunctional light-verb-frames. SLI-children show low verb diversity as measured by Verb Type Token Ration (TTR). The abundant use of a small set of light verbs or GAP verbs largely causes the low diversity (Rice, 1991; Rice and Bode, 1993; Watkins, Rice and Moltz, 1993; Conti-Ramsden and Jones, 1997). De Jong (1999) also found a preference for light verb constructions in Dutch-speaking SLI-children. The syntactic deficits in SLI-children could well be
linked to limitations in the verb (basic) lexicon: only a small set of verbs is acquired and available to the children with SLI to form their sentences.

Since we did not find a difference in the production of obligatory object verbs (see 8.6), we want to determine whether PI-children differ in the use of specific (obligatory) object verbs, such as split verbs and light verbs, compared to N-children. According to Thrift (2003), from three years on split verbs should undergo less object drop, because they represent telic events. In order to determine whether problems with aspect or telicity play a role in PI-children, this section addresses the question whether PI-children use more (less complex) split verbs with a realized object than N-children in the conversational interview. And, is there a comparable development with age?

The relative meaninglessness or lightness of 'light' verbs is the cause of their transitivity: they need the expression of internal arguments in order to be sufficiently meaningful. Therefore, we also want to determine whether PI-children use more (less complex) light verbs with a realized object than N-children in the conversational interview. And, is there a comparable development with age?

So-called split verbs are lexical verbs consisting of a verbal part and a particle. In Dutch, unlike English, particles exist as prefixes of an infinitival verb form unlike English. In finite clauses with verb second, particles are separated from its verb head and are located in sentence-final position (Haegeman, 1991; Booij, 1996, 1998). Dutch particles are for example: 'aan' (at), 'achter' (behind), 'af' (off), 'bij' (with), 'binnen' (inside), 'boven' (above), 'buiten' (outside), 'door' (through), 'in' (in), 'langs' (along), 'mee' (with), 'na' (after), 'neer' (down), 'om' (about), 'onder' (under), 'op' (up), 'open' (open), 'over' (over), 'rond' (around), 'tegen' (against), 'toe' (to), 'uit' (out), 'vast' (fast), 'voor' (in front of), 'voorbij' (past) and 'weg' (away). Split verbs can be obligatorily or optionally transitive. In this analysis, we only used the obligatorily transitive split verbs, partly according to Krämer's classification list of split verbs (1995) and partly according to the classification list of Schepers (see Appendix 8h).

The following examples are tests for telicity (Dowty, 1979). In Example 10, the activity is ongoing, hence an adverbial phrase 'een uur lang' (for an hour) can be added without causing ungrammaticality. In contrast, 'in een uur' (in an hour) cannot be added because it requires the event to have an intrinsic endpoint.

Example 10  
Atelic activity  
Het meisje eet koekjes *een uur lang* in een uur.  
The girl eats cookies *an hour long* in an hour.  
The girl eats cookies for an hour* in an hour.

In Example 11, with the particle 'op' (up), the event cannot be ongoing, as the ungrammaticality of 'een uur lang' (for an hour) shows. The addition of 'in een uur' (in an hour), however, is grammatical.
Example 11  
Telic activity

Het meisje eet de koekjes op *een uur lang/in een uur.  
The girl eats cookies up *for an hour/in an hour.

In Example 11, the PI-children use the split verb 'opeten' (to eat up) with 'eten' (to eat) as the main verb and 'op' (up) as the particle that describes a telic situation: an activity with an intrinsic terminal point.

Example 12  
The use of a split verb (PI-child; age 6;7): the child tells a story of eating dog chocolates

Ronald:  
(had) had mijn oma ook eens keer (twee) twee [hondenchocolaatjes] opgegeten.  
had-my-grandmother-also-just-once-two-eaten-up.

Paraphrase:  
(once my grandmother had also eaten two)

In Example 12, the split verb 'opeten' (to eat up) takes two arguments to which it assigns a theta role: it assigns the role of agent to the subject argument ('oma' (grandmother)) and the role of patient to the object argument, the thing that is actually eaten up ('twee' [hondenchocolaatjes] (two [dog chocolates]).

As stated in 8.7.1, light or GAP verbs do not carry sufficient information in order to be meaningful without the expression of an object (Rice, 1991; Van Hout, 1994). Often these verbs express little more than a relation between entities. Without the realization of an object it is very hard to find contexts in which the reduced meaning of the light verb is clear. Therefore, light verbs take an internal argument, similarly to obligatory transitive split verbs. Examples of light-verb-constructions are 'maken' (make), 'zetten' (put) and 'leggen' (put), such as in 'een dansje maken' (make a dance) in Dutch or 'make a phone call' in English (Krämer, 1995). Example 13 shows a T-unit with the use of the light verb predicate 'hebben' (to have).

Example 13  
The use of a light-verb-construction (PI-child; age 4;2)

Gary:  
je heb heleboel prikpennen op het derde bord.  
you-have-a-lot-of-drawing-pins-on-the-third-board.

Paraphrase:  
(you have a lot of drawing-pins on the third board)

In Example 13, the predicate 'hebben' (to have) assigns the role agent to the subject argument ('je' (you)) and the role patient to the object argument: the thing that is
undergoing the action expressed by 'hebben' (to have), namely 'prikpennen' (drawing-pins).

### 8.7.2 Results: Split and Light Verbs

From Figure 8.11, we see that PI-children produce significantly more split verbs than the N-children \( (F(6,105)=4.188; \ p<.043) \)35 (Appendix 8i). PI-children more frequently use a particle with the verb than a full PP compared to the N-children, particularly the four and the six-year-old PI-children. These children show a slight preference for a verb construction with a particle. In the group of PI-children older than six years this slight preference disappears. An explanation could be that the older PI-children make fewer errors in realizing a more complex full prepositional phrase and prefer the use of a PP to a split verb construction (see 5.6: Table 5.7).

Figure 8.11: Development with age of the number of split verbs (related to obligatory object contexts) in 45 N-children and 120 PI-children in the conversational genre

As can be seen from Table 8.7, PI-children use as many obligatory objects whenever a split verb is used compared to the N-children36. Split verbs seem to trigger the production of an object complement. Possibly, PI-children may benefit from this type of obligatory object verbs to construct reduced sentences: the use of a particle stands for a full PP.

To summarize, PI-children have significantly more split verb frames compared to N-children, but the PI-children do not show significantly more missing obligatory objects with the use of split verbs, as might be expected from the results found with the realization of objects (see 5.4).

35 ANCOVA with Particle verbs as dependent variable, T-units with a finite verb as covariate and age as independent variable in the N-children (4-6-8yrs) and PI-children (4-5-6-7-8-9yrs) is used.

36 ANCOVA with Realized obligatory objects in particle verbs as dependent variable, Obligatory particle verbs as covariate and age as independent variable in the N-children (4-6-8yrs) and PI-children (4-6-8yrs) is used. No significant group, age or group*age interaction effect was found.
Table B.7  

Mean total number, percentage (related to total number of split verbs) and standard deviations of split verbs with realized obligatory objects in 45 N-children and 120 PI-children in the conversational genre.

<table>
<thead>
<tr>
<th>Split verbs with realized obligatory objects</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>4yrs</td>
<td>1.80</td>
<td>100%</td>
</tr>
<tr>
<td>6yrs</td>
<td>1.40</td>
<td>100%</td>
</tr>
<tr>
<td>8yrs</td>
<td>2.13</td>
<td>97%</td>
</tr>
<tr>
<td>Total mean</td>
<td>1.76</td>
<td>99%</td>
</tr>
</tbody>
</table>

The analysis of the so-called semantic 'light' verbs show results similar to these found with the production of split verbs. PI-children use significantly more of these semantically 'light' verbs compared to N-children (F(6,98)=10.761; p<.001)\textsuperscript{37} (see Figure 8.12; Appendix 8j). We found no significant linear development with age in both groups. Thus, PI-children still use verbs that do not carry sufficient information in order to be meaningful and therefore need the realization of an object to be pragmatically appropriate (see 12.6 and 14.4).

Figure B.12  

Development with age of the number of light verbs (related to obligatory object verbs) in 45 N-children and 120 PI-children in the conversational genre.

Again, similar results were found as in the analysis of split verbs: if light verbs are used, no object drop occurs in either the N-children or in the PI-children\textsuperscript{38}. The

\textsuperscript{37} ANCOVA with Light verbs as dependent variable, Obligatory object verbs as covariate and age as independent variable in the N-children (4-6-8yrs) and PI-children (4-5-6-7-8-9yrs) is used. Also a significant age effect is found (F(2,98)=6.897; p<.002).

\textsuperscript{38} ANCOVA with Realized obligatory objects in light verbs as dependent variable, Light verbs as covariate and age as independent variable in the N-children (4-6-8yrs) and PI-children (4-5-6-7-8-9yrs) is used.
The ability to package morphosyntactically: connectivity and transitivity

semantics transparency of light verbs helps the PI-children to produce obligatory objects. Thus, PI-children produce significantly more light-verb-frames compared to N-children indicating that PI-children show more semantic problems than the same-aged N-children. No problems with the realization of objects are found whenever a light verb frame is used. PI-children recognize the pragmatic obligatoriness of the object in a light verb predicate. The missing obligatory objects described in 5.4 occur more with the production of semantically 'full' - as opposed to 'light' - obligatory object verbs: the PI-children show difficulties in assigning the correct semantic role to arguments constituents with these semantically 'full' verbs.

8.7.3 Conclusion: Split and Light Verbs

Overall, PI-children do use significantly more 'less complex' verbs, such as split and light verbs, compared to N-children. A frequent use of split verbs is also found in Dutch-speaking LI-children (e.g. Schotvanger, 2003). The higher frequency of split verbs found in PI-children compared to N-children could imply a slight preference of verbs that represent a telic event over verbs that represent atelic events. From age four on, these split verbs should undergo less object drop, since Thrift (2003) states that reduction in object drop rates and the acquisition of the determiner system seems to co-occur in the acquisition of Dutch.

As we have seen in 5.4, PI-children show problems in expressing obligatory objects. However, we did not find an abnormal rate of object drop in PI-children if a split verb was used. The results found in PI-children show that they behave as expected linguistically, since they realize enough obligatory direct objects within a telic-verb-frame for their age when compared to the N-children and to results from the developmental literature (Thrift, 2003). PI-children from the age of four seem to benefit from telic split verbs that seem to trigger obligatory direct objects easily. The relatively high number of split verbs reduces the length of the utterance (see 8.2), since a particle is produced instead of a full PP, comparable to the negative influence of the high frequency of copula verbs, found in the PI-children (see 8.6).

Furthermore, PI-children also produce significantly more light verbs compared to the N-children. PI-children rely more heavily on the light-verb-constructions that serve as multifunctional verb frames, just like SLI-children (Rice, 1990; De Jong, 1999). These results indicate a problem with semantic information exchange by means of the lexical verb. This could imply that they have a more restricted (basic) verb lexicon. The results of the receptive vocabulary test of the Language Tests for Children (Van Bon and Hoekstra, 1982) shows that 14% of the PI-children indeed have problems with lexical choice (see 3.2.3). Research with eight-year-old Dutch-speaking PI-children does not confirm this. They make less use of semantic subordinate and superordinate relations in their errors, resulting in different types of errors than found in normally developing children; this could also be the case for the basic lexicon related to verbs (Polišenská, 2003).

Semantically light verbs are supposed to trigger direct objects relatively easily (e.g. Van Hout, 1996) and indeed fewer ungrammatical missing objects within light-verb-constructions were observed than in more semantically specific-verb-constructions in the PI-children, comparable to the N-children. On the basis of the results related to
missing objects (see 5.4) we would have expected more problems in this area. This proved not to be the case.

8.8 General conclusions: the ability to package morphologically/syntactically

An overall conclusion is that low complexity and errors in complex constructions are widespread among a subgroup of PI-children, as is listed in Table 8.8.

Table 8.8 The ability to package morphosyntactically in the conversational genre: connectivity by the use of clausal ellipsis, conjunction reduction and embedded clauses and the transitivity of lexical verbs, split verbs and light verbs

<table>
<thead>
<tr>
<th>The ability to package morphosyntactically</th>
<th>N-children n=45/75/240</th>
<th>PI-children n=60/120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connectivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Errors in clausal ellipsis</td>
<td>6.2%</td>
<td>26.2%*</td>
</tr>
<tr>
<td>Errors in conjunction reduction constructions</td>
<td>23.2%</td>
<td>42.2%*</td>
</tr>
<tr>
<td>Errors in embedded clauses</td>
<td>13.6%</td>
<td>46.6%*</td>
</tr>
<tr>
<td>Transitivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of Obligatory object verbs</td>
<td>43.2%</td>
<td>41.7%</td>
</tr>
<tr>
<td>Use of Optional object verbs</td>
<td>19.3%</td>
<td>25.9%</td>
</tr>
<tr>
<td>Use of Intransitive verbs</td>
<td>19.8%</td>
<td>20.9%</td>
</tr>
<tr>
<td>Use of Copula verbs</td>
<td>17.4%</td>
<td>21.3%*</td>
</tr>
<tr>
<td>Use of Split verbs</td>
<td>5.2%</td>
<td>6.7%*</td>
</tr>
<tr>
<td>Use of Light verbs</td>
<td>1.2%</td>
<td>3.0%*</td>
</tr>
</tbody>
</table>

* significant difference at the .05 level

With respect to the length of the T-units, we found that a third of the PI-children showed a slightly too short MLU compared to the same-aged N-children from the STAP-population. Probably, the omitted lexical and functional categories (5.1 to 5.7; 7.2 to 7.4) and the relatively high number of copula and split verbs together influence the length of sentences negatively. Also a small subgroup of the PI-children cannot produce very long T-units measured with MLUL, which could indicate a disability in morphosyntactic packaging with respect to conjunction reduction and embedded clause constructions that in general generate high MLUL scores. However, the PI-children did not produce fewer of these two complex constructions. Thus, the low MLU and MLUL scores are not related to deficiencies in the connectivity of clauses, but only to deficiencies in the use of 'full' transitive verbs.

Next, three different types of connections were analysed that are examples of morphosyntactic packaging and involve complex morphological/syntactic skills.
First, although the PI-children did not produce fewer clausal ellipsis constructions, they produce significantly more morphosyntactically incorrect clausal ellipsis. The incorrectness was mainly caused by the omission of obligatory head-categories Determiner (within a NP) and Preposition (within a PP) and not by errors related to lexical categories that were mostly correctly left implicit. Second, the PI-children use conjunction reduced clauses as frequently as the N-children, but they make significantly more errors. These errors were predominantly caused by difficulties in explicating the specifier position of the functional head-category complementizer. Again, the lexical categories were mostly correctly left implicit in packaged conjunction reduction constructions. Third, the PI-children produce as many embedded clauses as the N-children, but they make more errors in these structures. Especially, difficulties in explicating the head-category complementizer can partly explain these errors.

In general, although PI-children as a group also showed errors, such as semantically erroneous choice of conjunction (see also 13.3) and absence of the required final placement of the finite verb (see also 6.4), they especially have difficulties in realizing functional heads, such as obligatory determiners, prepositions, coordinating and subordinating conjunctions in sentence-first position. These disabilities to package morphosyntactically indicate difficulties in producing hierarchically linked clauses to express multiple ideas. These problems in morphosyntactic packaging could be related to auditory processing difficulties in PI-children, especially with the computation of sentence-initial linguistic information (see 2.3.1). Additionally, although PI-children are able to produce complex transitive verb forms requiring either obligatory or optional objects as frequently as N-children, they use significantly more of semantically 'less complex' copula, split and light verbs as opposed to the same-aged N-children. Firstly, structures with a copula verb do not need a full argument structure, in fact, object complements are even not allowed. Using this type of verb, PI-children can escape from their difficulties in producing the patient, goal, theme etc., although copula verbs have a semantically restricted contribution to the sentence. Secondly, split and light verbs do trigger obligatory objects more easily than semantically 'full' transitive verbs. Due to the telicity of these split verbs and the semantically lightness of 'light' verbs, PI-children from age four on seem to benefit from these types of verbs, since no abnormal rate of ungrammatical missing objects were observed in both verb types. This finding contrasts with the use of obligatory transitive verbs by PI-children that frequently co-occurred with an abnormal rate of missing objects (see 5.4).

Comparably to SLI-children, we found that PI-children rely slightly more on light-verb-constructions that serve a multifunctional purpose (Rice, 1990; De Jong, 1999). Since PI-children show problems with the hierarchical ordering of semantic relations in the use of nomina (Polišenská, 2003), this could also be the case for the basic lexicon related to verbs. Future research in the group of PI-children is needed to confirm this.

Processing problems could be another explanation for the low morphosyntactic packaging found (see 2.3.1). Memory dysfunctioning might disturb the ability to keep the form of a specific connection (clausal ellipsis, conjunction reduction or
embedded clause) in mind in order to leave the target information correctly implicit (e.g. Tannock, Purvis and Schachar, 1993; Tannock and Schachar, 1996). Deficits in working memory are closely associated with language-impaired children and PI-children with externalizing disorders, such as ADHD (Cohen et al., 2000).

The analysis of the ability to establish connectivity and transitivity again provide evidence for the presence of an uneven language profile in PI-children. PI-children make twice as many errors as the N-children at the level of connectivity (e.g. Leonard, 1996). The oldest PI-children seem to resemble the youngest N-children in the use of incorrectly formed reduced and embedded clauses: they are delayed in establishing connections between clauses. In addition, PI-children significantly use more copula, split and light verbs, as younger normally developing children do (De Houwer and Gillis, 1998; Gillis and Schaerlaekens, 2000): these results again pinpoint to a delay in using morphological/syntactic verb rules.
9 Morphological/syntactic abilities in narrative: the genres compared

Annette Scheper

9.1 Introduction
In this research we are interested in the narrative as a separate genre and in comparison to the conversation. Particular attention will be paid to the relative contribution – and potential interactions among – different factors at two levels: morphological/syntactic and semantic factors at the sentence level (this chapter) and semantic/pragmatic factors at the discourse level (see Chapter 14). The general aim of this chapter is to examine different morphological/syntactic factors in the narrative genre that might determine the acquisition of linguistic devices relevant to temporal organisation, transitivity, agreement relations and packaging of clauses morphosyntactically.

Normally developing young children have access to a smaller amount of expressive options to construct a narrative. Cognitive, communicative and linguistic factors interact in a complex way as a basis to tell a good story (see Berman and Slobin, 1994:15). Cognitively, normally developing young children cannot grasp all the feasible perspectives from which a story can be told. It requires a Theory-of-Mind (e.g. Perner, 1991; Wellman, 1992) to distinguish the viewpoint of the narrator from that of the protagonists in a story (see 2.3.3). Communicatively, young children have difficulties in evaluating the listener's knowledge. They have to learn to keep the balance between given and old information. Linguistically, the young child has not yet acquired the full range of formal morphological/syntactic and semantic/pragmatic devices. From three years on, normally developing children learn to tell stories using unconnected sentences in which events are not causally related to each other and by the age of twelve they should produce embedded episodes with causally related events that are stories within stories (Berman and Slobin, 1994). From age five on, the ability to narrate causally related events start to develop parallel to the acquisition of specific morphological/syntactic structures and semantic relations (e.g. Kemper, 1984; Peterson and McGabe, 1983; Karmiloff-Smith, 1985; Berman, 1988).

Language acquisition researchers have shown a growing interest in the development of linguistic proficiency in narrative discourse based on (picture) story (re)tellings (e.g. Karmiloff-Smith, 1979; Bamberg, 1987; Hickmann, 1991, 2003; Berman and Slobin, 1994). An important reason to use a story is that it requires a problem-solving strategy in order to narrate the events of the story-line. Primary-school-aged normally developing children are able to narrate the multiple sequential steps to the solution (e.g. Karmiloff-Smith, 1983; Westby, 1999). Stories are particularly useful to assess the awareness of planning, false beliefs, or deceit, related to a Theory-of-
Chapter 9 Morphological/Syntactic narrative and conversational development

Mind (see 2.3.3). Awareness of internal mental states is critical for planning, monitoring and evaluating both individual personal goals (for example completing a homework assignment) and interpersonal goals (playing a competitive game) (Westby, 1999) (see 2.3.1). When plans involve other people, the planner must consider their emotional responses. As children's social-cognitive development and its related perspective taking develops, they are able to integrate more and more pieces of (linguistic) information simultaneously. Since the narrative genre requires children using their Theory-of-Mind (e.g. Perner, 1991; Wellman, 1992) to distinguish the viewpoint of the narrator from that of the protagonists in a story, it is considered to be morphologically/syntactically more complex as a genre than the conversation. One of the prerequisites for telling a narrative is the availability of a full array of morphological/syntactic and lexical devices in order to express a hierarchically organized goal plan of actions (Berman, 1988; Trabasso and Rodkin, 1994).

The problems that children with (S)LI and PI-children experience with linguistic skills and perspective taking can result in producing non-hierarchically organized clauses in a narrative. English-speaking PI-children with emotional or adjustment problems proved to have difficulties in offering a solution to a problem-solving story (not the Frog story) or in completing the middle of stories when given the beginning (goal) of the story and the end (resolution) (Spivack, Platt and Shure, 1976). An explanation for this disability to manipulate multiple pieces of information is often given in terms of a limited (auditory) working memory as part of executive functioning (2.3.1), such as is the case in PI-children with ADHD (Westby, 1999). Obviously, executive dysfunctioning has an impact on a narrative task involving interpersonal interactions and planning, because simultaneous attention to multiple elements of the story-line is required (see 2.3.1).

In this thesis, the narrative data are collected by means of the picture story book "Frog, where are you?" (Mayer, 1969) (see 3.4.1). An advantage of using a picture story for eliciting narrative data is that a common content is provided for all children (see also 14.1). An important reason to use the Frog story in particular was that it has already been used in earlier research, which makes cross-linguistic comparison possible. Berman and Slobin (1994) have done some of such work with respect to specific morphological/syntactic and semantic/pragmatic aspects. Additionally, the Frog story stretches the narrative abilities of children, since the story is quite long and consists of a number of events.

In this chapter, we will explore to what extent Dutch PI-children show a clear difference in their morphological/syntactic performance at clause level (local representation) in the exchange of multiple pieces of information in the two genres, the conversational interview and the narrative. In particular, we shall consider the extent to which the narrative genre increases the morphological/syntactic problems found in the conversation (see Chapters 4 to 8).

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1 The Frog story is about a boy and his dog that captured a pet Frog in a jar. The Frog escapes. The boy and the dog go out and try to find it. The boy's main goal is to recover his frog and after a series of adventures, they find the frog again (Mayer, 1969).
As discussed in 3.3, it can be assumed on the basis of the developmental literature that the narrative is a morphosyntactically more complex task and that therefore possible language problems will increase (Ervin-Tripp, 1989). The use of specific lexical and functional categories — the hard core of errors and complexity problems found in the conversational genre — will be explored in both 120 PI- and 45 N-children from the Roelofs-population (1998) (see 4.3) in a genre-comparison.

First, the grammatical form of the narrative in comparison to the conversation will be described in 9.2. The time frame of the narrative or temporality is described in 9.3. Temporality is analysed by means of tense marking on verbs and lexical marking of aspect with prepositions and particles (see also 5.6 and 8.7). Next, the transitivity of verbs and their arguments in the narrative is discussed (9.4). In 9.5, the ability to realize the functional category subject-verb agreement and determiner-noun agreement is described. Furthermore, the ability to package morphologically/syntactically, such as by use of conjunction reduction and subordination, is compared in both genres (9.6). Finally, general conclusions are formulated related to the differences and similarities in morphological/syntactic performance in the narrative and conversational genre (9.7).

9.2 The ability to produce Grammatical Utterances: the genres compared

9.2.1 Research questions, definitions and operationalisations

Our main question in this section is to what extent PI-children have problems with the grammatical form in the narrative genre and whether PI-children show similar grammatical performance in the narrative genre compared to the conversational interview. The grammatical form of the narrative is measured by the total number of ungrammatical narrative T-units and grammatical errors. We expect that the narratives of the PI-children show more ungrammaticality compared to their normal age-matched peers. The second expectation is that PI-children with grammaticality problems in the conversation also show comparable or even more problems in the narrative, since the narrative task is more complex.

In the narrative genre the basic narrative unit of analysis is 'a narrative T-unit' (Hunt, 1970:4), comparable to the basic unit of analysis in the conversational genre (see also 4.1 and 4.2.1).

Example 1

Basic unit of analysis: a narrative T-unit (PI-child; age 6;1)

Johan: de jongen gaat naar buiten.
(the boy goes outside)

In Example 1, a single T-unit with the verb 'gaan' (to go) is treated as a basic unit of analysis. In Dutch, constituents in which the verb is lacking due to grammatical

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2 A handbook for the morphological/syntactic analysis related to the ability to produce lexical and functional categories in the narrative has been developed (Scheper, 1996).

3 T-unit is a main or independent clause with all its modifiers and subordinate clauses (Hunt, 1970:4) (see also 4.1 and 4.2.1).
reductions such as conjunction reduction (Example 2) and where the verb semantics is fully recoverable from the text can be treated as separate clauses, resulting in a single T-unit (see also 8.4).

Example 2  
Basic unit of analysis: a T-unit and a reduced clause, resulting in a single T-unit (P/child; age 7;4)

Gerdolf: de jongen keek in zijn laars en de hond Ø in de fles.
(the boy looked in his boots and the dog Ø in the jar)

In Example 2, the predicate of the T-unit 'keek' (to look) is reduced in the second conjunct beginning with the coordinating conjunction 'en' (and), resulting in a grammatical conjunction reduction construction in Dutch. Since the simultaneity of one activity with two different subjects is expressed, the sentence is judged as having two clauses. Also syntactic packaged clauses with subordinate or relative clauses can be treated as two different clauses, but a single T-unit (see also 8.5) (Example 3).

Example 3  
Basic unit of analysis: a T-unit and a subordinate clause, resulting in a single T-unit (PI-child; age 5;2)

Johan: hij dacht, dat het een uil was.
(he thought that it was an owl)

In Example 3, the predicate expresses two situations (activity and mental state), and therefore they are treated as two different clauses: a T-unit with a verb of cognition 'denken' (to think) and a subordinate clause with the verb 'zijn' (to be) and the subordinating conjunction 'dat' (that), resulting in a single T-unit.

Although a T-unit is defined by the presence of a unified predicate, a T-unit does not always have to contain an overt verb. Verbless T-units that are critical to the storyline must be coded also.

We used all the T-units in the story in order to measure the morphological/syntactic errors and complexity variables in the narrative genre. Since the length of the story could vary in the number of T-units, we calculated the proportions of errors and complexity variables to be able to compare the groups of children and in order to compare the performance in the narrative to the performance in the conversation (Blankenstijn, Roelofs and Scheper, to appear; see 4.2.1).

As is to be expected, adult narrators produce rather longer texts than children (Berman and Slobin, 1994). In adult narratives length and complexity are interrelated factors, although some adults produced shorter, but more condensed versions (complex) than certain children. Contrary to the expectation that the number of clauses would increase throughout the course of development, no significant increase in number of clauses per text were found across children aged five to nine years. Across five languages (English, German, Spanish, Hebrew and Turkish) N-children produce texts of much the same length, ranging from around 30 to 50, with an average of about 40 clauses per text – a length which provides a sense
of some kind of 'normative' text for this task: not too lengthy in elaborative detail, not yet condensed to just a few clauses long (Berman and Slobin, 1994:30). Therefore, Berman and Slobin conclude that length in itself is not critical for producing a felicitous narrative based on the Frog story picture book (see also 14.1).

9.2.2 Results: Grammatical Form in two genres
In this section we first present the length of the Frog story in narrative clauses in order to determine different morphological/syntactic variables. Since in adult narratives length and complexity are interrelated aspects, we are also interested in whether the length of the narrative increases with age in both the N- and the PI-children (Berman and Slobin, 1994) (see 14.1). Figure 9.1 (and Appendix 9a) shows the length of the narrative in T-units produced by the N- and PI-children. Interestingly, PI- and N-children were comparable with regard to the length of the Frog story. A significant age effect was found only in the PI-children \( F(5,119) = 6.310; p<.013; \) R squared .05; Eta squared .08, which can be partly explained as a linear increase: the length of the story increases with age in the PI-children.

Figure 9.1 Development with age of the story length measured by number of narrative T-units in 45 N-children and 120 PI-children

When we compare the grammaticality of narrative T-units in both groups of children, however, we see from Figure 9.2 (and Appendix 9a) that PI-children produce significantly more ungrammatical T-units in their narratives than their peers \( F(6,105) = 16.684; p<.000 \)\(^5\), as we might have expected on the basis of the conversation (see 4.4). The decrease with age in both groups of children is a linear one: younger children have more ungrammatical T-units in their narratives than older children (PI-children: \( F(5,114) = 7.447; p<.007; \) R squared .06; Eta squared .11; N-children: \( F(2,42) = 21.483; p<.000; \) R squared .32; Eta squared .38).

4 ANOVA with total number of narrative T-units as dependent variable and age (4-5-6-7-8-9yrs) as independent variable is used in the N- and PI-children. No significant group or interaction effect is found between the N- and PI-children in the narrative genre.

5 ANCOVA with total number of ungrammatical narrative clauses as dependent variable, total number of narrative clauses as covariate and age (4-5-6-7-8-9yrs) as independent variable is used in the N- and PI-children. No significant interaction effect is found between the N- and PI-children in the narrative genre.
We find comparable results with regard to the total number of grammatical errors: PI-children show significantly more morphological/syntactic errors in their narratives than the N-children (Figure 9.3; Appendix 9b) (F(6,105) = 21.015; p<.000)\(^6\). Also a significant age effect is found in both groups, which can be partly explained as linear decrease with age: again, the younger children make more grammatical errors than the older ones (PI-children: F(5,114) = 10.085; p<.002; R squared .08; Eta squared .15; N-children F(2,42) = 13.607; p<.001; R squared .23; Eta squared .28).

In order to compare the grammaticality problems in PI-children in the conversational and narrative genre, we correlated the occurrence of ungrammaticality in both genres in the PI-children. We found a strong linear relation...
Morphological/Syntactic abilities in narrative: the genres compared

(\(r=0.533; p<0.000\))\(^7\) between the genres that means that PI-children who produce a relatively high number of ungrammatical T-units in the narrative also show comparable problems in the conversation. Especially the four, five and eight year old PI-children show a comparable performance related to grammaticality in the two genres.

Table 9.1 Genre comparison of the percentage of ungrammatical narrative and conversational T-units (related to the total number of narrative and conversational T-units) in 120 PI-children

<table>
<thead>
<tr>
<th>Ungrammatical T-units narrative and conversation</th>
<th>Narrative</th>
<th>Conversation</th>
<th>Genre comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>Pearson's correlation</td>
</tr>
<tr>
<td>4yrs</td>
<td>52.16%</td>
<td>43.79%</td>
<td>.682** (.000)</td>
</tr>
<tr>
<td>5yrs</td>
<td>43.81%</td>
<td>31.89%</td>
<td>.447* (.024)</td>
</tr>
<tr>
<td>6yrs</td>
<td>36.12%</td>
<td>36.49%</td>
<td>.277 (.118)</td>
</tr>
<tr>
<td>7yrs</td>
<td>30.76%</td>
<td>29.89%</td>
<td>.321 (.084)</td>
</tr>
<tr>
<td>8yrs</td>
<td>34.63%</td>
<td>32.19%</td>
<td>.524** (.009)</td>
</tr>
<tr>
<td>9yrs</td>
<td>26.57%</td>
<td>27.69%</td>
<td>.164 (.244)</td>
</tr>
<tr>
<td>Total PI-group</td>
<td>37.34%</td>
<td>33.66%</td>
<td>.533** (.000)</td>
</tr>
</tbody>
</table>

\(\star\) Correlation is significant at the .05 level (1-tailed).

As expected, we find that the PI-children produce even higher percentages of ungrammatical T-units in their narratives than in their conversations (Figure 9.4). This supports the idea that the narrative genre is more complex and takes an even more fine-grained application of morphological/syntactic rules in order to produce grammatical narrative T-units.

\(^7\) Pearson's product-moment-correlation coefficient (pmcc) (Van den Brink and Koele, 1985:69) is used to measure the correlation of the percentage Ungrammatical clauses (related to the percentage of clauses) in the narrative and conversational genre in the 120 PI-children.
Figure 9.4 Genre comparison of the percentage of ungrammatical narrative and conversational T-units (related to the total number of narrative and conversational T-units) in 120 PI-children

9.2.3 Conclusion: Grammatical Form in two genres
No difference is found with respect to the length of the narrative in both groups of children: N- and PI-children use comparable number of T-units to tell the Frog story (see also 14.1). Berman and Slobin (1994) also found comparable results in their five to nine aged normally developing children. However, there is a clear difference in performance related to grammaticality: PI-children have more ungrammatical narrative T-units than the N-children. In this result the PI-children as a group behave similarly in the narrative and the conversational genre. On an individual basis, we found a significant correlation between the grammatical performance of the PI-children in the two genres. The degree of ungrammaticality in the narrative is even higher than in the conversational interview. This finding is as expected, since the narrative genre is morphosyntactically more complex.

9.3 The ability to express Temporality: the genres compared
9.3.1 Research questions, definitions and operationalisations
Temporality is a fundamental category of human experience and cognition and a critically important factor in the organization of language. A speaker talks at a given time about something that happened at the same or a different given time. The speaker has to assign a certain temporal structure to each utterance. In all languages temporality can be expressed through different linguistic means: temporal features on the verb (tense, aspect, Aktionsart), adverbs, prepositions and particles may constitute the time frame of the narrative (see also 7.2).
In child language acquisition, three concepts of time are applied in order to characterize tense semantics: Speech Time (S), Event Time (E) and Reference Time (R) (Reichenbach, 1947). The time of the actual event time (E) is related to speech time (S), which usually serves as a deictic centre. Reference time is the time for which the claim is made and also called Topic Time (Klein, 1992; Behrens, 1993).
Telling a story involves situating it on a time axis. Temporality is an important factor in the organization of narrative structure. The central distinction between foreground and background is based on temporal categories (e.g. Reinhart, 1983; Hatav, 1985). Foregrounded utterances can be characterized as (a) referring to an event (with the crucial property being temporal bounded), and (b) standing in a shift-in-time-relation. A principle of chronological order applies as the 'default case' for foregrounded clauses and these constitute the temporal skeleton of the narrative (Aksu-Koç and Von Stutterheim, 1994). Backgrounded utterances, in contrast, are not part of the advancing plotline, such as utterances which refer to temporally unbounded states. These utterances contain information about situational circumstances (temporal and spatial) or they may provide explanations or comments from the point-of-view of the speaker temporally anchored in speech time (Aksu-Koç and Von Stutterheim, 1994; Hickmann, 2003).

As already discussed in 7.2, language acquisition studies have shown that the first marking of temporal notions in children's speech is typically through the verb inflectional system. Children in different languages first acquire inflections used for marking the present (and/or progressive) and later the past. One way of organizing a narrative is to maintain an anchoring tense across the text. Three-year-old normally developing children mostly show 'mixed' tense usage, veering back and forth from present to past tense, lacking a single grammatical tense (Berman and Slobin, 1994). The number of narratives in which there is not one consistently favoured tense (mixed tense) is expected to decrease as children grow older. Young children of four and five years will use present tense as the anchoring tense (Example 4) and older children will gradually use the past tense more often (Aarssen, 1996) (Example 5).

Example 4 The present tense as dominant tense to tell the Frog story (PI-child; age 5:11)

Andre:

dit is een kikkertje.
(this is a little frog)
Andre:

het is nacht.
(it is evening)
Andre:

dan gebeurt er iets.
(then something happens)
Andre:

de kikker loopt weg.
(the frog runs away)
Andre:

dan wordt het jongeje wakker.
(then the little boy wakes up)

In Example 4 the PI-child uses the present tense in the first narrative T-unit to narrate the Frog story. The present tense is maintained in the consecutive narrative T-units, in which the child continues to tell specific initiating events of the story.

Example 5 The past tense as dominant tense to tell the Frog-story (PI-child; age 8:2)

Tanja:

maar Jan [hondje] zat achter een steen.
(but John was hiding behind a rock)
Tanja:

en die zag hij niet.
(and he did not see him)
Tanja:

toen viel hij in een boom dat geen boom was.
(then he fell in a tree that wasn't tree)
In Example 5 the past tense is used instead of the present tense to tell the Frog story. Older children will develop skills to organize their story temporally and learn to distinguish different functions of simultaneity with respect to foregrounding and backgrounding of narrative information. Children will start to look for expressive devices that mark these distinctions and therefore a developmental change from local to global organization is predicted. The morphology of the verb can be adjusted to indicate temporal characteristics of the event related to.

In telling the Frog story the use of infinitives and the absence of verb forms suggest that young four and five-year-old children do not give an account of events, but instead give static descriptions based on the pictures. Infinitives are used for the description of a static situation, similar to merely mentioning characters and objects without presenting them as actors in the story. However, narrative discourse requires finite verb forms. From age five and six on, the present tense becomes the most prominent anchoring tense, and past tense forms start to appear in the data. First, they appear rather randomly (mixed present/past tense) and apparently unmotivated. From age eight, however, past tense forms start to become more prominent, becoming the most frequently used anchoring tense at age nine and ten (Bamberg, 1994; Sebastián and Slobin, 1994; Aarssen, 1996). Turkish monolingual children, however, prefer present tense (Aarssen, 1996:159), since in Turkish only the present tense is appropriate for telling narratives (Aksu-Koç, 1994).

In this section the question is whether PI-children show more problems with the marking of temporality in the narrative genre compared to the same-aged N-children and compared to the conversational interview. The use of verbless T-units, past tense errors and anchoring tense are analysed as different linguistic components that may constitute the time frame of the narrative. Missing verb forms indicate that children do not give an account of events but instead give static descriptions of the story. Therefore, the specific question is asked: *do PI-children show a comparable number of missing lexical verbs in the narrative and conversational genre?* Furthermore, an important category of temporality, tense marking, is studied in relation to the finiteness of the verb. The specific question is: *do PI-children show a comparable number of complex past tense forms in the narrative and conversational genre?* Finally, another way of organizing a narrative is to maintain an anchoring tense across the text. Therefore, the specific question *which tense do PI-children use as anchoring tense (present or past tense) to organize the time structure of the narrative or do PI-children still use mixed tense (present/past tense)* is asked. As children get older, the number of narratives with mixed tenses is expected to decrease.

The analysis of lexical verbs and past tense marking uses the definitions and criteria described in 5.2 and 7.2.1. Verbless T-units, i.e. T-units that do not contain an overt
(lexical) verb, are often critical to the story-line, indicating that children have not yet developed dynamic event representations.

The choice of a consistently favoured tense throughout the narrative expressing foreground events was taken as the criteria for a well-formed narrative and called the anchoring tense. Past tense is the unmarked or most typical temporal setting for the (re)telling of a narrative. However, speakers can also choose to depart from this norm by adopting the more marked 'narrative' or historic use of the present tense for the main thread of the narrative (Berman and Slobin, 1994). Thus, children can either start to narrate foregrounded events in present tense or past tense, defined as the introductory tense: the time choice for foregrounded events throughout the story (see 14.2).

Tense-shifting is a strategy to manifest a kind of rhetorical flexibility distinguishing different functions of simultaneity with respect to foregrounding and backgrounding of narrative information. Adult narrators also use this motivated tense-shifting, but they are selective in their use of this device. Thus, normally developing children need to learn to use a dominant anchoring tense. Three-year-olds switch between present and past tense often from clause to clause, based on picture-description strategies, rather than either syntactic or narrative considerations. This switching of tenses starts to decline at age four and then longer stretches of utterances continue in the same tense.

If tense-shifts occur too frequently and are unmotivated, the narrative has no clear anchoring tense to establish coherency. According to Aarssen (1996:137), two types of unmotivated tense-shifts are counted:

1. Tense-shifts from present to past or vice versa in the middle of the story
2. Tense-shifts from present to past or vice versa within a single clause

Following Aarssen (1996), in order to distinguish single unexpected motivated tense-shifts from real unmotivated shifts that mark disorganization of the narrative, the minimal number of single shifts was set at five. We determined whether 60 PI-children of four, six and eight years of age maintained the introductory tense, present or past tense, throughout the story as anchoring tense or whether they showed more than 5 unmotivated tense-shifts (set as the criterion for the use of mixed tense).

9.3.2 Results: Temporality in two genres

Narrative discourse requires finite verb forms. The narratives of the PI-children contain significantly more missing lexical verbs compared to the N-children (F(1,98)=9.043; p<.003), although we find a significant decrease with age in the PI-children (F(5,113)=4.470; p<.001) as well as in the N-children (F(2,41)=4.930; p<.012) (see Appendix 9c).

Table 9.2 shows the number of missing lexical verbs in the narratives and the conversations of PI-children. A significant correlation between the two genres is
found in the use of missing lexical verbs \((r=.355; \ p<.000)^8\): children with a high number of missing lexical verbs in the conversation show comparable behaviour in the narrative (see also Figure 9.5).

Table 9.2 Genre comparison of the percentage of missing lexical verbs (related to the total number of narrative and conversational T-units) in 120 PI-children

<table>
<thead>
<tr>
<th>Missing lexical verbs</th>
<th>Narrative</th>
<th>Conversation</th>
<th>Genre comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>Pearson's correlation</td>
</tr>
<tr>
<td>4yrs</td>
<td>17.07%</td>
<td>12.94%</td>
<td>.501*</td>
</tr>
<tr>
<td>5yrs</td>
<td>6.88%</td>
<td>7.93%</td>
<td>.090</td>
</tr>
<tr>
<td>6yrs</td>
<td>4.46%</td>
<td>9.59%</td>
<td>.311</td>
</tr>
<tr>
<td>7yrs</td>
<td>4.56%</td>
<td>4.07%</td>
<td>.135</td>
</tr>
<tr>
<td>8yrs</td>
<td>8.04%</td>
<td>5.69%</td>
<td>.369</td>
</tr>
<tr>
<td>9yrs</td>
<td>4.67%</td>
<td>6.43%</td>
<td>.022</td>
</tr>
<tr>
<td>Total PI-group</td>
<td>7.61%</td>
<td>7.76%</td>
<td>.355**</td>
</tr>
</tbody>
</table>

** Correlation is significant at the .01 level (1-tailed).
* Correlation is significant at the .05 level (1-tailed).

From Table 9.2, we see that the four-year-old PI-children have 17% omitted verb forms narrating the Frog story. This indicates that they do not always give an account of events but instead give static descriptions of the pictures of the story: PI-children list the protagonists, the boy and the animals, and other objects, such as the bed, the jar, the hole, the tree, etc. Comparable results are found in the narratives of normally developing children of four and five years (Berman and Slobin, 1994). In the PI-children the number of missing verb forms decreases with age, thus the older PI-children are more aware of the fact that a T-unit almost always needs the explicitation of a lexical verb. Only the eight-year-old PI-children show a slight increase in missing verb forms, which cannot be explained.

Figure 9.5 Genre comparison of the percentage of missing lexical verbs (related to the total number of narrative and conversational T-units) in 120 PI-children

---

8 Pearson's pmc coefficient is used to measure the correlation of the percentage Missing lexical verbs (related to the percentage of narrative and conversational T-units) in the narrative and conversational genre in 120 PI-children.
Table 9.3 shows the number of simple past tense forms used by the PI-children in the narrative and the conversational genre. Only a significant linear increase of past tense forms with age is found in the PI-children ($F(2,57) = 8.905; p<.004; R^2 = .13; \text{Eta squared } = .13$). A significant correlation between the two genres is found in the use of the past tense: individual PI-children perform comparably in the narrative and in the conversational interview and this is predominantly caused by the performance in marking simple past tense in the four-year-olds. The six- and eight-year old PI-children produce more past tense in the narrative which is more as expected. We were not able to carry out a group comparison of the PI- and the N-children for reasons of time.

Table 9.3  
<table>
<thead>
<tr>
<th>Marking of simple past tense</th>
<th>Narrative</th>
<th>Conversation</th>
<th>Genre comparison</th>
<th>Pearson's correlation value</th>
<th>sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4yrs</td>
<td>21.20%</td>
<td>18.25%</td>
<td></td>
<td>.723**</td>
<td>.000</td>
</tr>
<tr>
<td>6yrs</td>
<td>41.03%</td>
<td>19.43%</td>
<td></td>
<td>.009</td>
<td>.484</td>
</tr>
<tr>
<td>8yrs</td>
<td>59.13%</td>
<td>29.74%</td>
<td></td>
<td>.117</td>
<td>.312</td>
</tr>
<tr>
<td>Total PI-group</td>
<td>40.45%</td>
<td>22.47%</td>
<td></td>
<td>.285*</td>
<td>.014</td>
</tr>
</tbody>
</table>

When we observe the error-rate, however, in simple past tense marking no significant linear correlation in performance is found in both genres (Table 9.4): PI-children make fewer errors in the narrative compared to the conversation. PI-children did not show many inflectional past tense marking errors (Category 1 errors in section 7.2) nor unmotivated tense-shifts within a T-unit and subordinate clause (Category 2 errors in 7.2), but the error-rates predominantly involved unmotivated tense-shifts between T-units (Category 3 errors in 7.2) ($r = -.257; p<.024$).

9 One-way ANCOVA with total number of simple past tense forms (related to the total number of clauses) as dependent variable and age (4-6-8yrs) as independent variable.
10 Pearson's pmc coefficient is used to measure the correlation of the variable percentage Simple past tense forms (related to the percentage of total number of clauses) in the narrative and conversational genre in the 120 PI-children.
11 Pearson's pmc coefficient is used to measure the correlation of the percentage Simple past tense errors (related to the percentage of past tense forms) in the narrative and conversational genre in the 120 PI-children.
12 Pearson's pmc coefficient is used to measure the correlation of the percentage Tense-shifts between T-units (related to the percentage of past tense errors) in the narrative and conversational genre in the 120 PI-children.
Table 9.4  Genre comparison of percentage of errors in marking simple past tense (related to the total number of T-units with past tense) in 120 PI-children

<table>
<thead>
<tr>
<th>Past tense errors</th>
<th>Narrative</th>
<th>Conversation</th>
<th>Genre comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>Pearson's correlation</td>
</tr>
<tr>
<td>4yrs</td>
<td>0.65%</td>
<td>2.60%</td>
<td>.108</td>
</tr>
<tr>
<td>6yrs</td>
<td>0.62%</td>
<td>2.61%</td>
<td>.171</td>
</tr>
<tr>
<td>8yrs</td>
<td>0.36%</td>
<td>2.14%</td>
<td>.296</td>
</tr>
<tr>
<td>Total PI-group</td>
<td>0.55%</td>
<td>2.45%</td>
<td>.083</td>
</tr>
</tbody>
</table>

The performance of PI-children in switching from the past tense to the present between T-units is comparable in both genres: PI-children use this tense-shifting strategy frequently, indicating a temporal disorganization of the narrative and the conversational genre. A more important point is that the tense-shift strategy is used relatively more often in the interview (86.58% of all past tense errors) than in the narrative (63.29%). These high numbers of tense-shifting suggest that PI-children are not yet able to use a dominant or anchoring tense to establish temporal global organization in their narratives and only use mixed tenses, indicating local organization.

As described earlier, we used the criterion of 5 or more unmotivated tense-shifts (alternating usage of the present and the past tense) to classify the narrative as having mixed tense (see introduction 9.3). Table 9.5 presents a quantitative overview of the number of PI-children using an anchoring tense: 10% uses mixed (present/past) tense, 55% present tense and 35% past tense. A significant difference is found between the subgroup of PI-children that uses mixed and present tense opposed to a subgroup that uses the past tense as anchoring tense (p<.000)\textsuperscript{13}.

Table 9.5  Genre comparison of number of PI-children using an anchoring tense or mixed tense

<table>
<thead>
<tr>
<th>Anchoring or Mixed tense</th>
<th>Mixed tense</th>
<th>Present tense</th>
<th>Past tense</th>
</tr>
</thead>
<tbody>
<tr>
<td>4yrs</td>
<td>3</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>6yrs</td>
<td>1</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>8yrs</td>
<td>2</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>6 (10%)</td>
<td>33 (55%)</td>
<td>21 (35%)</td>
</tr>
</tbody>
</table>

\textsuperscript{13} Binomial test was used in PI-children to measure the differentiation in the different tense categories. No significant difference was found in the subgroup of PI-children that used the 'mixed tense' and the subgroups that used exclusively present or exclusively past tense. A significant result was observed only in the subgroup of PI-children that uses mixed and present tense opposed to a subgroup that uses the past tense as anchoring tense (p<.000).
Surprisingly, the majority of the four-year-olds start off their narratives with present tense instead of the mixed tenses found in Dutch-speaking children by Aarssen (1996) (see also 14.2). Between age four and six most PI-children choose the present tense as the anchoring tense in their narratives, although past tense forms also start to appear but still one mixed tense is used. From age eight on, children show a preference for the past tense as dominant tense, as is also found by Aarssen (1996). However, two eight-year-olds still use mixed tenses, characteristic for narratives of young children, whereas the eight-year-olds of Aarssen (1996) no longer used this tense-shifting strategy. Overall, PI-children as a group show a tendency to use present tense as dominant tense (n=33) more often than the past tense (n=21).

9.3.3 Conclusion: Temporality in two genres
A small subgroup of PI-children is not able to organize their narratives and interviews in a temporal and global manner. Absence of verb forms in both genres indicates that a subgroup of PI-children does not give an account of events, but rather give static descriptions. Even more importantly, they also have too many unmotivated tense-shifts in both genres, switching from past to present and vice versa.

With regard to the narrative genre, a small subgroup of PI-children relies on the usage of mixed tense, indicating only local temporal organization. These PI-children fail to establish a single grammatical tense as a means of temporal anchoring a unified narrative thread: they are unable to remain anchored within a consistent narrative mode, but keep moving into and out of the picture-describing mode, like normally developing children of three years of age.

A large subgroup of PI-children learn to use a fixed tense to narrate the Frog story as a unified whole: tense-mixing was found to decrease over time and PI-children select either present or past as the dominant tense in which to anchor the narrative, resulting in a preference of the past tense as anchoring tense over the present in the oldest PI-children. However, two eight-year-old PI-children are using the mixed-tense-strategy of young normally developing children between the age of three and five. In general, PI-children show that they can relate the events depicted in the pictures of the Frog story to a fictive world that is not concurrent with the time of speaking, as is found in the developmental literature of acquiring an anchoring tense (Berman and Slobin, 1994; Aarssen, 1996).

9.4 The ability to express Transitivity: the genres compared

9.4.1 Research questions, definitions and operationalisations
Narrators of a story have to select a point-of-view in presenting the content of a particular scene, also called perspective (Berman and Neeman, 1994:308). Perspective can be divided into local perspective that is that the scene is treated as an isolated situation, or global perspective that is that the scene is treated as part of a larger narrative context.

In this section, we focus on local perspective that is expressed by two interrelated morphological/syntactic aspects: (1) transitivity of the verb, for example is the
activity self-contained or perpetrated upon some other entity; and (2) the argument array, for example, which arguments are selected as syntactic subjects or direct and/or oblique objects.

As described in the preceding chapters, we found that PI-children showed particularly difficulties in identifying the obligatory kernel of the sentence frame in the conversational genre (see 5.3, 5.4 and 8.6). PI-children too frequently leave lexical verbs and their arguments unrealized compared to N-children. If they select a verb frame, they favour less complex verb frames, like copula verb constructions that take no object complement at all, resulting in static event descriptions (see 8.6). If PI-children select a more complex transitive verb form that takes a 'full' argument structure, that is, an obligatory subject and an object, they reveal severe problems in realizing these arguments or they choose the types that are less complex, such as split and light transitive verbs (see 8.6 and 8.7). Although missing structural elements might be related to language problems in the area of semantics/pragmatics, they are mainly morphological/syntactic in character, since the systematic implementation of the morphological/syntactic spell-out rules for Dutch seem the core problem in the language acquisition of PI-children. Additional evidence for this idea was found in the fact that a strong correlation exist between the occurrence of ungrammatical missing subjects and objects in the PI-children, reflecting severe problems with the grammatical rules for the external as well the internal argument. We expect, therefore, to find greater difficulties in producing complex obligatory transitive verbs and in producing the 'full' argument structure required in telling the Frog story, a more complex genre than the conversation. Thus, in this section, we want to determine whether PI-children show more difficulties with the degree of transitivity of verbs and the realization of the obligatory arguments in the narrative genre compared to the conversational interview.

In this section, we use the definitions and operationalizations related to the degree of transitivity of the verb and argument structure, as used in 5.3, 5.4 and 8.6. In Table 9.6, we present an overview of the different transitive and non-transitive verb forms that are ranked from the most transitive to the least transitive forms. Each type of verb is illustrated with an example from the Frog story.

In satellite-framed languages, like Dutch, German and English, the basic message of a movement-event is that an entity has moved along a path in a specified direction; the satellite conveys this core information (Talmy, 1985). By contrast, Spanish is a verb-framed language, because the core information of path and direction is generally conveyed by the verb alone. The division of satellite and verb-framed-languages has important consequences for the Frog story, in which there is much movement from place to place (e.g. Hickmann, Hendriks, Roland and Liang, 1994).
Table 9.6 The use of the different transitive and non-transitive verb frames in the Frog story

<table>
<thead>
<tr>
<th>Transitive /Non-transitive verbs</th>
<th>Examples narrative genre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obligatory transitive verb</td>
<td>De jongen heeft een kikker</td>
</tr>
<tr>
<td></td>
<td>The boy has got a frog</td>
</tr>
<tr>
<td>Split verb</td>
<td>Het hert pakt de jongen op</td>
</tr>
<tr>
<td></td>
<td>The deer lifted the boy up</td>
</tr>
<tr>
<td>Light verb</td>
<td>De hond doet niets</td>
</tr>
<tr>
<td></td>
<td>The dog does nothing</td>
</tr>
<tr>
<td>Optional transitive verb</td>
<td>De jongen roept [naar de kikker]</td>
</tr>
<tr>
<td></td>
<td>The boy calls [for the frog]</td>
</tr>
<tr>
<td>Intransitive verb</td>
<td>De jongen valt [op de grond]</td>
</tr>
<tr>
<td>Copula verb</td>
<td>De jongen is blij</td>
</tr>
<tr>
<td></td>
<td>The boy is happy</td>
</tr>
</tbody>
</table>

In Dutch, like in German and English, the verb simply indicates the fact of movement, e.g. 'lopen' (walk), 'rennen' (run), etc. and the path satellites of the verb have to specify the direction, e.g. 'lopen naar' (walk to), 'weglopen' (walk away), etc. In addition, in Dutch and German (not English), path satellites encode a deictic viewpoint through prepositional phrases, such as 'op de rots' (on the rock), 'in de boom' (in the tree) or particles, such as 'afspringen' (jumping off), 'opspringen' (jumping up), 'wespringen' (jumping away) etc. Dutch thus provides rich possibilities for detailed description of motion in a given direction in a given manner and elaborates location by means of its elaborate verb-satellite and prepositional constructions (Bamberg, 1994) (see 14.3).

The use of verb particles adds meanings of change of state/location, often in combination with verbs of manner. Particles place such verbs into transitive frames to encode change of state/location in a particular manner. These specific 'less complex' split verbs also trigger object complements more easily (Example 6) (see also 8.7).

Example 6 The use of a split-verb-construction in the Frog story (PI-child; age 6.11)

Daniëlle: de jongen klimt de rots op
          the-boy-climbs-the-rock-on
          (the boy climbs on the rock)
Paraphrasis: de jongen klimt de rots op [om zijn kikker te roepen]
               the boy climbs on the rock [to call his frog]

In Example 6, the PI-child uses the verb 'klimmen' (to climb) to express movement, but the particle 'op' (on) specifies the direction of the verb: the boy first stands on the
ground (place time 1) and then he climbs to another place (place time 2) that is 'on the rock'. By using the split verb 'opklimmen' (to climb on) the production of the object 'daar' (there) is necessary. What is more, the use of a particle in a split-verb-construction (in the example 'op' (on)) reduces the need to express a full prepositional phrase to specify the place, such as 'op de rots' (on the rock). PI-children could benefit from the use of split verbs in telling the Frog story, since these verbs add meanings of change of state/location to the sentence and they trigger object complements more easily.

Comparably, as is the case with split-verb-constructions, light verbs also need an object complement in order to become semantically transparent (Example 7).

Example 7 The use of a light-verb-construction depicted by picture eight: the boy is calling for the frog near the wood (PI-child; age 8,3)

Jeffrey: de jongen doet dit
the-boy-does-this
(the boy is doing this)

Comment: the boy is bringing his hands to his mouth to call for the frog

In Example 7, the PI-child uses the light verb 'doen' (to do) in combination with the direct object 'dit' (this): two obligatory argument positions are lexically realized, however, the semantic information is insufficient (see 12.5).

9.4.2 Results: Transitivity in two genres

The performance in the narrative genre of PI-children of the production of the four verb types to examine the degree of transitivity (see also 5.4 and 8.6) in the narrative genre differs from the performance in the conversational genre: no significant linear correlations were observed between the two genres14 (Table 9.7): PI-children show a different performance in both genres related to transitivity. Unfortunately, we were not able to carry out a group comparison of the PI- and the N-children due to lack of time.

Table 9.7 Genre comparison of the percentage of different verb types related to transitivity (related to the narrative and conversational T-units with a verb) in 120 PI-children

<table>
<thead>
<tr>
<th>Transitivity of verbs</th>
<th>Narrative</th>
<th>Conversation</th>
<th>Pearson's correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>value</td>
</tr>
<tr>
<td>Obligatory object verbs</td>
<td>24.64%</td>
<td>41.7%</td>
<td>.105</td>
</tr>
<tr>
<td>Optional object verbs</td>
<td>11.69%</td>
<td>15.9%</td>
<td>-022</td>
</tr>
<tr>
<td>Intransitive verbs</td>
<td>54.65%</td>
<td>20.9%</td>
<td>.150</td>
</tr>
<tr>
<td>Copula verbs</td>
<td>10.02%</td>
<td>21.3%</td>
<td>.084</td>
</tr>
</tbody>
</table>

14 Pearson's pmc coefficient is used to measure the correlation of the percentage Obligatory object verbs, Optional object verbs, Intransitive verbs and Copula verbs (related to the percentage of T-units with a verb) in the narrative and conversational genre in 120 PI-children.
Specifically, in their narratives PI-children use intransitive verbs the most (55%), followed by obligatory object verbs (25%), then optional object verbs (12%) and lastly copula verbs (10%). Figure 9.6 shows the different verb types in the two genres used by the PI-children.

**Figure 9.6** Genre comparison of the percentage of different verb types related to transitivity (related to the narrative and conversational T-units with a verb) in 120 PI-children

The distribution of the different verb types differ in both genres. PI-children use 55% intransitives in the narrative as opposed to 21% in the interview. On the other hand, in the conversational genre PI-children use 42% obligatory transitives in the interview as opposed to 25% in the narrative. In order to narrate a hierarchically, goal-directed story, the proportion of obligatory and optional object verbs should increase with age. Remarkably, only a third of the used verb types in the narrative involve transitive verb frames that are perpetrated upon another person or entity. In the conversational genre, however, PI-children use transitive verb frame, whether obligatory or optional, half of the time. This clear difference in performance is probably due to the relatively more complex genre of the narrative. PI-children show a clear preference for intransitive verb structures (55%) that represent activities that are self-contained instead of focused upon some other person or entity. They also use 10% copula verbs that represent static descriptions. Frequent use of copula verbs is characteristic for three-year-old normally developing children (Berman and Slobin, 1994). Taken together, 65% of all verb types consist of either self-contained or static activities. Both verb types are single-argument verbs that require only an obligatory external argument the subject. Since intransitive and copula verbs cannot trigger an obligatory direct object and cannot be passivized, they often present an agentive-perspective: the boy-protagonist is the prime activator of whatever happens (Aksu-Koç, 1994). Additionally, both verb frames allow a morphological/syntactic optional prepositional object to express place, time and manner, such as in for example ‘the boy looks [in his boots]’ or ‘the boy wakes up [in the morning]’. Thus, PI-children show a preference for using single-argument intransitive and copula verbs that predominantly express change-of-state, location or time, resulting in grammatical narrative T-units. These are, however, usually semantically/pragmatically unclear, since obligatory components of the so-called Goal-Action-Outcome (GAO) units that are units that encode
actions as relevant to a goal plan to narrate the plot of the Frog, are not realized (Trabasso and Rodkin, 1994:88; Blankenstijn and Scheper, 2003) (see also for definitions 14.3).

In line with the strong preference for intransitive verbs, PI-children also prefer to use less complex transitive *split verbs*, triggering more easily a direct object and expressing directionality more easily, as was also found in the interview (Table 9.8) (see 8.7).

**Table 9.8** Genre comparison of the percentage of split verbs (related to the total number of obligatory object verbs) in 120 PI-children

<table>
<thead>
<tr>
<th>Split verbs</th>
<th>Narrative</th>
<th>Conversation</th>
<th>Genre comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>%</td>
<td>value</td>
<td>Pearson’s correlation</td>
</tr>
<tr>
<td>4yrs</td>
<td>7.89%</td>
<td>7.79%</td>
<td>.004</td>
</tr>
<tr>
<td>5yrs</td>
<td>8.51%</td>
<td>5.80%</td>
<td>.005</td>
</tr>
<tr>
<td>6yrs</td>
<td>7.96%</td>
<td>9.88%</td>
<td>.168</td>
</tr>
<tr>
<td>7yrs</td>
<td>9.35%</td>
<td>6.86%</td>
<td>.298</td>
</tr>
<tr>
<td>8yrs</td>
<td>9.18%</td>
<td>7.34%</td>
<td>.118</td>
</tr>
<tr>
<td>9yrs</td>
<td>9.32%</td>
<td>8.71%</td>
<td>.154</td>
</tr>
<tr>
<td>Total PI-group</td>
<td>8.70%</td>
<td>7.76%</td>
<td>.100</td>
</tr>
</tbody>
</table>

PI-children rely slightly more on these split-verb-constructions in telling the events of the story (9%) compared to the conversation (8%), except for the six-year-old PI-children. Unexpectedly, no significant linear correlation was found in the performance in both genres\(^{15}\). With age the use of split verbs in the narrative slightly increases, but no linear age effect was observed\(^{16}\) (Figure 9.7).

**Figure 9.7** Genre comparison of the percentage of split verbs (related to the total number of obligatory object verbs) in 120 PI-children

---

\(^{15}\) Pearson's \(p\)mc coefficient is used to measure the correlation of the percentage Split verbs (related to the percentage of obligatory object verbs) in the narrative and conversational genre in 120 PI-children.
First, since the transitive split verb frames trigger an obligatory direct object, we find that PI-children frequently use an underspecified direct object, such as the use of light adverbials (see 6.3; 12.5), such as 'daar' (there), 'er' (there) or 'hier' (here) or referentially unclear (pro)nouns, such as 'het' (it) (see 14.4 to 14.7). The result is that the PI-children produce T-units that are morphologically/syntactically correct, but semantically/pragmatically marked, since the expression of the location of the event remains semantically unclear.

Second, since the particles in split-verb-constructions negatively influence the production of full prepositional phrases (expressing mostly place), the number of realized locations is reduced. This has a negative influence on the expression of the Goal-Action-Outcome (GAO) units necessary to narrate the plot (see 14.3.4).

Another less complex verb form that needs the explicitation of a direct object due to its semantic lightness is the category light verbs, as is also discussed in 8.7. Again, PI-children use light-verb-constructions in expressing related events (Table 9.9).

<table>
<thead>
<tr>
<th>Light verbs</th>
<th>Narrative</th>
<th>Conversation</th>
<th>Genre comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>Pearson's correlation %</td>
</tr>
<tr>
<td>4yrs</td>
<td>5.88%</td>
<td>3.32%</td>
<td>.248</td>
</tr>
<tr>
<td>5yrs</td>
<td>5.06%</td>
<td>3.01%</td>
<td>.295</td>
</tr>
<tr>
<td>6yrs</td>
<td>3.29%</td>
<td>2.29%</td>
<td>.360</td>
</tr>
<tr>
<td>7yrs</td>
<td>2.87%</td>
<td>1.99%</td>
<td>.029</td>
</tr>
<tr>
<td>8yrs</td>
<td>2.38%</td>
<td>1.42%</td>
<td>.237</td>
</tr>
<tr>
<td>9yrs</td>
<td>2.40%</td>
<td>1.79%</td>
<td>.001</td>
</tr>
<tr>
<td>Total PI-group</td>
<td>3.65%</td>
<td>2.30%</td>
<td>.297**</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the .01 level (1-tailed).

A significant linear correlation is found in the production of light-verb-constructions in both genres (p<.001)17. With age PI-children show a significant decrease in the use of light verbs (F(5,113)=2.947; p<.015)18 (Figure 9.8).

---

16 One-way ANCOVA with total number of split verbs (related to the total number of obligatory object verbs) as dependent variable and age (4-5-6-7-8-9yrs) as independent variable in the PI-children.

17 Pearson's pmc coefficient is used to measure the correlation of the percentage Light verbs (related to the percentage of obligatory object verbs) in the narrative and conversational genre in the 120 PI-children.

18 One-way ANCOVA with total number of light verbs (related to the total number of obligatory object verbs) as dependent variable and age (4-5-6-7-8-9yrs) as independent variable in the 120 PI-children.
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Light verbs need the realization of a direct object to carry sufficient semantic information. PI-children also frequently use light adverbs (see 6.3; 12.5), such as 'zo' (this way) or referentially unclear pronouns or nouns, such as 'het' (it), which are semantically underspecified direct objects. These are sometimes morphologically/syntactically marked, but always semantically/pragmatically (see 14.5 to 14.7).

From the results in the conversational interview we know that PI-children have significantly more difficulties in realizing obligatory arguments of the verb compared to N-children (see 5.3 and 5.4). In principle, each sentence in Dutch needs an overt subject. Comparing the two genres with respect to ungrammatical missing subjects, the performance of PI-children in the narrative significantly correlates with the performance in the interview ($r=.521; p<.000$)\(^{19}\) (Table 9.10).

Table 9.10 Genre comparison of the percentage of ungrammatical missing subjects (related to the total number of finite narrative and conversational T-units) in 120 PI-children

<table>
<thead>
<tr>
<th>Ungrammatical missing subjects</th>
<th>Narrative</th>
<th>Conversation</th>
<th>Genre comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$%$</td>
<td>$%$</td>
<td>value</td>
</tr>
<tr>
<td></td>
<td>sig.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$4yrs$</td>
<td>6.75%</td>
<td>8.45%</td>
<td>.665**</td>
</tr>
<tr>
<td>$5yrs$</td>
<td>2.68%</td>
<td>2.23%</td>
<td>.196</td>
</tr>
<tr>
<td>$6yrs$</td>
<td>2.37%</td>
<td>4.37%</td>
<td>.252</td>
</tr>
<tr>
<td>$7yrs$</td>
<td>1.10%</td>
<td>1.53%</td>
<td>-.253</td>
</tr>
<tr>
<td>$8yrs$</td>
<td>1.01%</td>
<td>3.98%</td>
<td>.263</td>
</tr>
<tr>
<td>$9yrs$</td>
<td>1.42%</td>
<td>3.52%</td>
<td>.156</td>
</tr>
</tbody>
</table>

Total PI-group 2.56% 4.01% .521** .000

** Correlation is significant at the .01 level (1-tailed).

\(^{19}\) Pearson's $r$ coefficient is used to measure the correlation of the percentage Ungrammatical missing subjects (related to the percentage of finite T-units) in the narrative and conversational genre in the 120 PI-children.
From Figure 9.9 it is clear that the PI-children have slightly more difficulties in realizing subjects in the conversation than in the narrative. With age PI-children show a significant non-linear decrease in the number of ungrammatical missing subjects produced in the Frog story ($F(2,98)=15.938; p<.000^{20}$).

The use of obligatory object verbs requires an object, except in cases of discourse topic drop (see 5.4). The performance of PI-children in the narrative significantly correlates – although not linearly – with the performance in the interview related to ungrammatical missing objects: four and five-year-old PI-children show relatively more problems in the narrative, whereas from the age of six on relatively more difficulties are found in the conversational genre ($r=.294; p<.001^{21}$) (Table 9.11). Since the interview triggers relatively more obligatory object verbs than the narrative, PI-children increase their chance to make an error by not realizing the obligatory direct object.

---

20 One-way ANCOVA with total number of Ungrammatical missing subjects (related to the total number of finite T-units) as dependent variable and age (4-5-6-7-8-9yrs) as independent variable in the narratives of 120 PI-children.

21 Pearson's $r$ coefficient is used to measure the correlation of the percentage Ungrammatical missing objects (related to the percentage of obligatory object verbs) in the narrative and conversational genre in the 120 PI-children.
Table 9.11  Genre comparison of the percentage of ungrammatical missing objects (related to the total number of obligatory object verbs) in 120 PI-children

<table>
<thead>
<tr>
<th>Ungrammatical missing objects</th>
<th>Narrative %</th>
<th>Conversation %</th>
<th>Pearson's correlation value</th>
<th>Pearson's correlation sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4yrs</td>
<td>13.99%</td>
<td>12.08%</td>
<td>.288</td>
<td>.109</td>
</tr>
<tr>
<td>5yrs</td>
<td>5.42%</td>
<td>4.08%</td>
<td>.067</td>
<td>.389</td>
</tr>
<tr>
<td>6yrs</td>
<td>2.49%</td>
<td>5.24%</td>
<td>.220</td>
<td>.175</td>
</tr>
<tr>
<td>7yrs</td>
<td>1.73%</td>
<td>6.92%</td>
<td>.336</td>
<td>.074</td>
</tr>
<tr>
<td>8yrs</td>
<td>0.62%</td>
<td>6.75%</td>
<td>.012</td>
<td>.480</td>
</tr>
<tr>
<td>9yrs</td>
<td>2.85%</td>
<td>4.75%</td>
<td>.312</td>
<td>.090</td>
</tr>
<tr>
<td>Total PI-group</td>
<td>4.52%</td>
<td>6.64%</td>
<td>.294**</td>
<td>.001</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the .01 level (1-tailed).

Again, with age the PI-children show a significant non-linear decrease in making ungrammatical missing object (F(2,98)=9.645; p<.000)\(^{22}\) (Figure 9.10).

9.4.3 Conclusion: Transitivity in two genres

PI-children show a lack of transitivity in their narratives, since only a third of the used verb types in the narrative involve transitive verb frames that are perpetrated upon another person or entity. Instead they express local perspective predominantly by using less complex verb-constructions, such as intransitive, split and light verbs. By means of intransitives, they choose self-contained activities that are by definition

---

\(^{22}\) One-way ANCOVA with total number of Ungrammatical missing objects (related to the total number of obligatory object verbs) as dependent variable and age (4-5-6-7-8-9yrs) as independent variable in the narratives of 120 PI-children.
not focused on some other person or entity. Additionally, the use of particles in split-verb-constructions negatively influences the production of prepositional phrases that express place and therefore has an impact on the number of produced Goal-Action-Outcome (GAO) units to narrate the plot (see 14.3). It could be observed that in the case of split and light verbs PI-children produce transitive verb frames with a direct object that are, however, semantically not fully specified.

Next, regardless of the verb frame used, transitive or not, PI-children show difficulties in expressing the obligatory subject, resulting in ungrammatical sentences that frequently have no overt agent. PI-children describe specific events of the Frog story without specifying the boy, the dog or the frog or other protagonists that mostly take the semantic role of agent. If PI-children use the most complex obligatory object verb frame, however, the object is also frequently omitted: the semantic role of the patient is frequently left unspecified. Therefore, PI-children are often unclear about the point-of-view in presenting the content of a particular scene by leaving arguments unexpressed. This usually results in ungrammatical sentences that are also semantically/pragmatically marked (see 14.3). To summarize, PI-children show problems with expressing transitivity in order to narrate a hierarchically, goal-directed story.

9.5 The ability to express Agreement Relations: the genres compared

9.5.1 Research questions, definitions and operationalisations

In this section, a genre comparison of the ability to establish agreement relations between the subject and the verb and between the determiner and the noun in PI-children is the central issue (see also 7.3 and 7.4).

Relevant information of simple past tense marking (see 7.2) and subject-verb agreement relations (see 7.3) in Dutch has already been described in Chapter 7. With regard to determiner-noun agreement relations (see 7.4), we have to remark the following: in Dutch nouns are accompanied by articles that are grammatically marked for gender. Animals, when referred to by third-person pronouns, particularly in fables and fairytales, are usually marked by the (grammatical) gender of their nominal counterpart (Bamberg, 1994:221).

In the conversational interview, PI-children have acquired the verb second rule for establishing subject-verb agreement relations: they showed no difficulties with the acquisition of the functional category Inflection (INFL). However, they showed a delayed acquisition of the person and number paradigm between the subject and the verb compared to the same-aged N-children.

With regard to the determiner-noun agreement relations PI-children did not make significantly more gender and number marking errors compared to the N-children. Most vulnerable in the PI-children in the conversational genre were too many omissions of determiners, resulting in bare nouns and too many erroneous additions of determiners in a non-obligatory context: they do not specify or overspecify the mentioned referent, especially with a definite article, which is also pragmatically inappropriate: both results proved to be significant.
Therefore we expect that the PI-children show comparable problems with morphological subject-verb and determiner-noun agreement relationships in the narrative genre. We want to determine whether PI-children show the same number of subject-verb and determiner-noun agreement errors in the narrative genre compared to the conversational genre.

In the analysis of agreement relations, we used the definitions and operationalisations as described in 7.3 and 7.4.

9.5.2 Results: Agreement Relations in two genres

We found no significant linear correlation between the performance in number marking of the agreement between the subject and the verb in the two genres\(^{23}\) (Table 9.12): number marking errors related to subject-verb agreement in the conversational interview (1.9%) were slightly higher than this type of errors in the narrative genre (1.5%) (Figure 9.11).

<table>
<thead>
<tr>
<th>subject-verb agreement number marking errors</th>
<th>Narrative</th>
<th>Conversation</th>
<th>Genre comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>%</td>
<td>value</td>
<td>Pearson's correlation</td>
</tr>
<tr>
<td>4yrs</td>
<td>1.44%</td>
<td>1.6%</td>
<td>.054</td>
</tr>
<tr>
<td>6yrs</td>
<td>1.45%</td>
<td>2.7%</td>
<td>.135</td>
</tr>
<tr>
<td>8yrs</td>
<td>1.64%</td>
<td>2.9%</td>
<td>-.261</td>
</tr>
<tr>
<td>Total PI-group</td>
<td>1.51%</td>
<td>2.4%</td>
<td>-.019</td>
</tr>
</tbody>
</table>

Obviously, within the interview, PI-children made most agreement errors characterized by the use of plural subjects in combination with a singular-marked verb. However, the perspective of the main character in the Frog, namely that of the boy or the dog (both singular subjects) triggers singular-marking on the verb, which seems to be the unmarked form of the PI-children. Thus, instances of plural verb-marking might occur by using the perspective of the boy and the dog, but these instances are restricted to specific events depicted by the Frog story.

---

\(^{23}\) Pearson's product moment coefficient is used to measure the correlation of the percentage number marking errors related to S-V agreement (related to the percentage of clauses with a realized subject and verbal element) in the narrative and conversational genre in the 120 PI-children.
Next, as observed in the conversational interview, PI-children show either frequently missing agreement relations, that is, lack of the functional category determiner or an overspecified agreement relation.

First, Table 9.13 shows the results related to the missing determiner-noun agreement relations.

<table>
<thead>
<tr>
<th>Missing Determiner-Noun agreement</th>
<th>Narrative</th>
<th>Conversation</th>
<th>Genre comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>Pearson's correlation value sig.</td>
</tr>
<tr>
<td>4yrs</td>
<td>10.30%</td>
<td>5.6%</td>
<td>.659** .001</td>
</tr>
<tr>
<td>6yrs</td>
<td>2.25%</td>
<td>2.9%</td>
<td>.551** .006</td>
</tr>
<tr>
<td>8yrs</td>
<td>1.54%</td>
<td>2.4%</td>
<td>.084 .362</td>
</tr>
<tr>
<td>Total PI-group</td>
<td>4.69%</td>
<td>3.63%</td>
<td>.639** .000</td>
</tr>
</tbody>
</table>

** Correlation is significant at the .01 level (1-tailed).

A highly significant correlation between the two genres is found with respect to the instances in which a determiner is missing to establish an agreement relation with the noun (p<.000). With age PI-children show a significantly linear decrease of implicit determiner-noun agreement relations in the narrative genre (F(2,56)=10.345; p<.000)24 (Figure 9.12).

---

24 One-way ANCOVA with total number of Missing determiner-noun agreement relations (related to the total number of finite clauses) as dependent variable and age (4-6-8yrs) as independent variable in the 60 PI-children.
Chapter 9 Morphological/Syntactic narrative and conversational development

Figure 9.12 Genre comparison of the percentage of missing determiner-noun agreement relations (related to the percentage of finite narrative and conversational T-units) in 60 PI-children

The four-year-old PI-children, especially, establish even less agreement relationships within the noun phrase in telling the Frog story compared to the interview. The number of omitted agreement relations clearly decrease between the age of four and six year and older. Obviously, PI-children in this age-group have substantial difficulties in realizing the determiner to establish a correct determiner-noun agreement relationship.

An additional explanation for the missing determiners, in particularly the articles, is the fact that some target nouns elicited by the Frog story are not part of the basic lexicon, such as 'het hert' (neuter form) (the deer), 'de uil' (feminine form) (owl), 'het gewei' (the antler), 'de bijenkorf' (the beehive). The youngest PI-children find it difficult to determine the grammatical gender marking of the determiner to specify these specific nouns and leave the functional category empty, resulting in a missing agreement relation.

9.5.3 Conclusion: Agreement Relations in two genres

In general, PI-children show more difficulties with establishing agreement relations in telling the more complex narrative compared to the interview. Subject-verb agreement errors, such as for example 'ik hebben' (I have (+plural)), cause ungrammaticality of the narrative T-unit and do not contribute to cohesiveness of the story. By means of this type of agreement errors the subject-referent is unclear and therefore disturbs the local perspective, the vantage point from which the Frog story is told.

The youngest PI-children especially show difficulties in realizing the functional head category determiner in the narrative: they leave the determiner unrealized and use bare nouns instead, again contributing to ungrammaticality and to co-referential incohesiveness (see 14.4).
9.6 The ability to package morphologically/syntactically: the genres compared

9.6.1 Research questions, definitions and operationalisations
The central issue of this section is to explore to what extent narrative event descriptions are syntactically 'packaged' into multi-clause constructions (see also 8.4 and 8.5). In order to give a hierarchically organized representation of events depicted by the pictures of the Frog story, children need to learn to use complex morphological/syntactic constructions to establish connectivity and relate temporal, causal and motivational information between narrative clauses. Clauses can be joined by means of coordination, subordination and cross-clause information can be indexed by 'null forms' (Berman and Slobin, 1994). A sequence of two clauses which are temporally ordered and cohesively linked is the criterion for a minimal narrative, according to Labov (1972).

The ability to construct narrative discourse in the context of the Frog story task has been described in terms of a developmental path to achieve thematic connectivity (Berman and Slobin, 1994:44):

1. In the first phase, children will tend to treat each scene as an isolated event, with narrative organisation restricted to the most local level of the contents of individual pictures: they produce a sequence of clauses whose temporal order is iconic with the order of the narrated events.
2. In the second phase, children will chain events sequentially, giving evidence of a temporal organisation of more extended series of events, although still locally organized.
3. In the last developmental phase, narratives will be causally structured in terms of an hierarchically organized goal and plan of action.

Young children do not seem to understand that an event that is extended in time can serve as the cause of a following event, and they do not take one event as the background for another (e.g. Bamberg, 1994; Trabasso and Rodkin, 1994). As a consequence, there are very few subordinate clauses - and only those of a particular type: adverbial subordination with the subordinate clause placed before the matrix clause. Normally developing young children of three years of age show a repeated use of one specific type of coordinating conjunctions, for example 'en' (and) to the exclusion of other possible adversative, causal or temporal conjunctions (see 13.3), to link successive clauses, as if the narrative were the sum of a series of independent clauses to be interpreted contextually.

Over the course of school years, normally developing children increase the complexity of their sentences by imposing a linear organisation on events on the time axis display temporal chaining and grammaticized connectivity. From age five on, children start to make more use of conjoined and even embedded forms, although they show less variability in type of (subordinate) conjunctions (see also 13.3) and placement of the subordinate clause than adults. Relative clauses that are subordinated to a noun phrase and often present foregrounded events are the most difficult to acquire. The decrease of coordination in favour of subordination to
establish thematic connectivity begins at age nine. Nine-year-olds, whose stories are tightly organized around a plotline, achieve some level of thematic integration by chunking several events together by means of morphological/syntactic devices. The cognitive task of telling a narrative is a complex one, and the development of form-function interactions continues well after the age of nine. Finally, adults add the use of specific lexical items, increased layers of embedding, and specific discourse strategies, such as flashbacks and foreshadowing, which all contribute to creating thematic connectivity rhetorically (Berman and Slobin, 1994:368).

Since we observed difficulties in the ability of morphological/syntactic packaging in the conversational genre, we expect that the PI-children show comparable problems with establishing connectivity by means of discourse topic drop, conjunction reduction constructions and embedded clauses in the narrative genre. Therefore, we want to determine whether PI-children show comparable difficulties in the ability to package morphologically/syntactically in the narrative genre as found in the conversational genre.

In the analysis of morphological/syntactic packaging, we used the definitions and operationalisations as described in 5.3, 5.4, 8.4 and 8.5.

Three types of connective structures are analysed in the narrative and conversational genre. First, null arguments (subjects or objects) or cases of discourse topic drop (see for definitions 5.3 and 5.4) in Dutch can be used to create tightly-packed texts consisting of large chunks of verb-initial T-units with no surface subject or object (e.g. De Haan and Tuijnman, 1988; Berman and Slobin, 1994:324). Subject and object topic drop can be used as connective devices to establish co-referential cohesion. Second, by means of conjunction reduction constructions clauses are connected to each other and it is possible to achieve simultaneity of events (see for definitions 8.4). Third, by means of embedded clauses connectivity between clauses is achieved (see for definitions 8.5). In contrast to main clauses, other clauses that involve some type of subordination are further called embedded clauses, including subordinating and relative clauses. Clausal ellipsis, as defined in 8.2, can also be used as a connector between clauses, but is not included here.

The range of subordinate conjunctions expressing less to more complex relationships among a main and one or more subordinated clause(s) in Dutch are presented in Table 9.14 (Halliday and Hasan, 1976; Smith and Leinonen, 1992; Hickmann et al., 1994; Haeseryn et al., 1997:546) (see 13.3).

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25 Two or more clauses in the direct voice are not included in the analysis of embedded clauses, since one of the prerequisites to count as an embedded clause was the realization of a subordinating conjunction or an empty category at clausal boundaries.
Table 9.14 Different types of subordinating conjunctions in Dutch

<table>
<thead>
<tr>
<th>Semantic relations</th>
<th>Subordinating conjunctions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conditional</td>
<td>Form: e.g. 'als' (if), 'wanneer' (when), 'indien' (if), 'tenzij' (if) If you feel ill, then you have to stay at home</td>
</tr>
<tr>
<td>Adversative</td>
<td>Form: e.g. 'hoewel' (although), 'ondanks' (despite), 'zowel-als' (if-then) the frog is happy to go with the boy, although the frog will miss his family</td>
</tr>
<tr>
<td>Causal:</td>
<td>Form: e.g. 'omdat' (because); 'sinds' (therefore) the boy falls out of the tree (consequence), because he got frightened by the owl (cause) the swarm of bees chases after the dog (cause), therefore the dog is running fast (consequence)</td>
</tr>
<tr>
<td></td>
<td>- consequence-cause</td>
</tr>
<tr>
<td></td>
<td>- cause-consequence</td>
</tr>
<tr>
<td>Temporal:</td>
<td>Form: e.g. 'terwijl' (while); 'voordat' (before); 'nadat' (after); 'toen' (then) the boy searches in his boot, while the dog looks behind the stool the boy searches in his room, before he goes outside to look for the frog the dog licks the boy, after he got mad on the dog</td>
</tr>
<tr>
<td></td>
<td>- simultaneity</td>
</tr>
<tr>
<td></td>
<td>- posteriority</td>
</tr>
<tr>
<td></td>
<td>- anteriority</td>
</tr>
</tbody>
</table>

In the conversational genre we only counted the number of missing subordinating conjunctions and did not specify the different semantic relations between the main and the dependent part of the T-unit, mainly for time-consuming reasons (see 8.4). In addition, the narrative is a more sufficient tool to check whether PI-children are able to establish hierarchically linked clauses.

The order of complexity of coordinating conjunctions might be as follows: additive relationship is the first semantic relation that children learn to express, followed by adversative relationships and then by causal and temporal relationships (Gillis and De Houwer, 1998:66-68; Roelofs, 1998:117-118)26 (see also 13.3). The same developmental patterns might be found in relation to subordinating conjunctions. Causal subordinate conjunctions are difficult to acquire, since they suppose an underlying cause-consequence relationship expressed in the conjoined clauses and a temporal relationship between the events described. Normally developing young children can understand cause-consequence relationships and can express them in conjoined clauses (see first example of causal relationships in Table 9.14). The target sentence should be a right-branching embedded clause that is a consequence-cause relationship (second example of causal relationships in Table 9.14). So word order is involved in establishing these causal expressions and develops correctly from age nine on.

---

26 The subordinating conjunctions were not specified in the results of Roelofs (1998), since they were almost absent in the data.
Temporal subordinate conjunctions are classified according to the temporal relationship expressed in the subjoined clauses: establishing simultaneity, posteriority or anteriority between the main and the subordinate clause, like for example 'nadat' (after) (Hickmann et al., 1994:39). Temporal relationships are acquired relatively late, that is, from age nine (see also 13.3).

As we stated in 8.4, another way to establish connectivity is by means of relative clauses. Relative clause constructions in Dutch do not have morphological cues that mark grammatical role, but number agreement only might play a role. Relative clauses are placed after the head noun and the relative pronouns 'die' or 'dat' are used to refer to the noun. 'Die' is referring to masculine/feminine words that take the article 'de', whereas 'dat' is referring to neuter words that take the article 'het'. The complexity of a sentence depends on the grammatical functions of the head noun (Sheldon, 1974; see also 8.4). Restrictive relative clauses in which the head noun has the same function in the main clause as in the relativized clause are easier to comprehend than sentences in which these functions are different (Aarssen, 1996). MacWhinney (1982) introduced the notion of perspective as a more psycholinguistically oriented counterpart of the formal category. Both speakers and listeners prefer sentences in which subject matches the unmarked human perspective: they prefer to take perspective of active agents rather than of passive recipients, and they prefer to tell a story from the perspective of the main character rather than from the viewpoint of minor characters. MacWhinney (1982) postulates that structures in which the perspective is maintained are easier to process than those in which there is a shift of perspective. Since relative clauses in English, German and Dutch involve constraints on relative pronoun choice, word order and agreement, these structures are even sparingly used by normally developing children of nine-year-old (Bamberg, 1994; Sebastián and Slobin, 1994).

9.6.2 Results: packaging morphologically/syntactically in two genres

In general, all characters in the Frog story are linguistically referred to by cohesive devices, such as a full nominal expression or noun, and they may also be referred to by zero forms, such as null subjects (see also 14.4). As first part of morphological/ syntactic packaging, we present the ability to use these zero forms or cases of discourse topic drop between T-units. In general, in both genres the production of null arguments is not frequently used in the PI-children (see 5.3 and 5.4). Of all instances of missing arguments the real correctly established topic drop ranges from 2.49% to 9.99% for subjects and objects taken together.

If we compare the genres, the PI-children are not behaving in the same way with respect to connectivity in the narrative and in the conversation (Table 9.15). The appearance of null subjects and null objects shows in fact no regular pattern between the genres, since no significant linear correlations are found.
Morphological/Syntactic abilities in narrative: the genres compared

Table 9.15

<table>
<thead>
<tr>
<th>Discourse topic drop</th>
<th>Narrative</th>
<th>Conversation</th>
<th>Genre comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>value</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grammatical missing subjects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4yrs</td>
<td>7.46%</td>
<td>6.13%</td>
<td>-.148</td>
</tr>
<tr>
<td>6yrs</td>
<td>5.83%</td>
<td>4.00%</td>
<td>-.093</td>
</tr>
<tr>
<td>8yrs</td>
<td>2.49%</td>
<td>6.13%</td>
<td>-.181</td>
</tr>
<tr>
<td>Total PI-group</td>
<td>5.26%</td>
<td>5.42%</td>
<td>.107</td>
</tr>
<tr>
<td>Grammatical missing objects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4yrs</td>
<td>7.50%</td>
<td>10.24%</td>
<td>.011</td>
</tr>
<tr>
<td>6yrs</td>
<td>4.17%</td>
<td>5.31%</td>
<td>.335</td>
</tr>
<tr>
<td>8yrs</td>
<td>9.99%</td>
<td>6.50%</td>
<td>-.275</td>
</tr>
<tr>
<td>Total PI-group</td>
<td>7.22%</td>
<td>10.76%</td>
<td>-.046</td>
</tr>
</tbody>
</table>

Firstly, PI-children use subject topic drop as frequently in both genres. The four-year-olds show the highest number of discourse topic drops in both genres in the PI-children. As stated in 5.3.3, this may be an artefact of the fact that the PI-children drop many more subjects in total (see 5.3.2; 9.4.2). Some of these will be referentially clear (see 5.3.1). This does not mean, however, that the children have necessarily acquired the discourse topic rule and establish connectivity between two sequenced T-units (e.g. De Haan and Tuijnman, 1988). With age the number of grammatical missing subjects decreases in the narrative, whereas the number in the conversation drops between four and six years, but increases again to the level of the four-year-olds.

Secondly, PI-children use less object topic drop (7%) in the narrative genre than in the conversation (11%). We might expect an increase with age in the narrative genre, since the realization of object topic drop involves good language skills at the structural and referential level. However, the PI-children show a decrease with age probably pinpointing their problems with establishing co-referential coherence (see 13.5 to 13.7). Surprisingly, although the narrative is a more complex genre that places an even stronger claim on morphological/syntactic and semantic/pragmatic skills, PI-children do not perform far worse than in the conversational genre.

As second part of morphological/syntactic packaging, we want to examine whether PI-children can produce correctly formed conjunction reduction constructions establishing connectivity within clauses and one or more reduced clauses.
First, we find a significant linear correlation between the two genres in using constructions with conjunction reduction \((r = .154; p < .046)\) \(^{27}\). (Table 9.16): as expected, the PI-children show a comparable performance in both genres, since the PI-children use as many conjunction reduction constructions as the N-children (see 8.1.3). Second, we find no significant age effect in producing correctly formed conjunction reduction constructions in the narrative \(^{28}\). Also no significant linear correlation is found between the two genres \(^{29}\) (Table 9.16).

Table 9.16  Genre comparison of the percentage of total number of conjunction reduction constructions (related to the total number of narrative and conversational T-units) and the correctly formed conjunction reduction constructions (related to the total number of narrative and conversational T-units) in 120 PI-children

<table>
<thead>
<tr>
<th>Conjunction reduction total/correctly formed</th>
<th>Narrative</th>
<th>Conversation</th>
<th>Genre comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>%</td>
<td>Pearson's correlation</td>
<td></td>
</tr>
<tr>
<td>Total number</td>
<td></td>
<td>value</td>
<td>sig.</td>
</tr>
<tr>
<td>4yrs</td>
<td>3.44%</td>
<td>3.30%</td>
<td>.042</td>
</tr>
<tr>
<td>5yrs</td>
<td>5.05%</td>
<td>4.10%</td>
<td>.295</td>
</tr>
<tr>
<td>6yrs</td>
<td>4.43%</td>
<td>5.50%</td>
<td>.265</td>
</tr>
<tr>
<td>7yrs</td>
<td>4.11%</td>
<td>3.50%</td>
<td>-.066</td>
</tr>
<tr>
<td>8yrs</td>
<td>4.29%</td>
<td>4.40%</td>
<td>.410*</td>
</tr>
<tr>
<td>9yrs</td>
<td>5.86%</td>
<td>4.60%</td>
<td>.041</td>
</tr>
<tr>
<td>Total PI-group</td>
<td>4.53%</td>
<td>4.23%</td>
<td>.190*</td>
</tr>
<tr>
<td>Correctly formed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>%</td>
<td>Pearson's correlation</td>
<td></td>
</tr>
<tr>
<td>4yrs</td>
<td>2.53%</td>
<td>1.70%</td>
<td>.042</td>
</tr>
<tr>
<td>5yrs</td>
<td>3.07%</td>
<td>2.70%</td>
<td>.349</td>
</tr>
<tr>
<td>6yrs</td>
<td>3.08%</td>
<td>3.60%</td>
<td>.222</td>
</tr>
<tr>
<td>7yrs</td>
<td>2.90%</td>
<td>1.90%</td>
<td>-.148</td>
</tr>
<tr>
<td>8yrs</td>
<td>3.03%</td>
<td>3.40%</td>
<td>.204</td>
</tr>
<tr>
<td>9yrs</td>
<td>4.77%</td>
<td>3.30%</td>
<td>.210</td>
</tr>
<tr>
<td>Total PI-group</td>
<td>3.11%</td>
<td>3.75%</td>
<td>-.044</td>
</tr>
</tbody>
</table>

* Correlation is significant at the .05 level (1-tailed).

\(^{27}\) Pearson's \(p\)mc coefficient is used to measure the correlation of the percentage of the total number of conjunction reduction constructions (related to the total number of clauses) in the narrative and conversational genre in the 120 PI-children.

\(^{28}\) One-way ANCOVA with total number of Correctly formed Conjunction reduction constructions (related to the total number of conjunction reduction constructions) as dependent variable and age (4-6-8yrs) as independent variable in the 60 PI-children.

\(^{29}\) Pearson's \(p\)mc coefficient is used to measure the correlation of the percentage of correctly formed conjunction reduction constructions (related to the total number of conjunction reduction constructions) in the narrative and conversational genre in the 120 PI-children.
Morphological/Syntactic abilities in narrative: the genres compared

In Figure 9.13, the variability in performance pattern in both genres is shown: four-year-old PI-children produce more correct conjunction reduction constructions in the narrative compared to the conversation, whereas the five-year-olds are better in the conversation.

To conclude, the performance of PI-children related to this type of construction is not genre-dependent. Within the narrative genre, PI-children too frequently fail to use an explicit obligatory coordinate conjunction, such as 'en' (and), 'of' (or) or 'maar' (but), as the connector between the main and the reduced clause(s). PI-children also make errors in leaving structural information implicit in the reduced clause: they have difficulties in expressing the dependency relation between the main and the reduced part.

Figure 9.13  Genre comparison of the percentage of correctly formed conjunction reduction constructions (related to the total number of conjunction reduction constructions) in 120 PI-children

Finally, as third part of morphological/syntactic packaging, we look at the use of embedded clauses. First, we examine the subordinating clauses with a subordinating conjunction at clausal boundaries, including correct and incorrect forms. PI-children of four, six and eight years of age produce significantly fewer subordinating conjunctions compared to the N-children ($F(1,98)=12.288; p<.001$)\(^{30}\): an average of 4.5% in the PI-children opposed to an average of 8.5% in the N-children (Table 9.17). In both the N- and the PI-children a linear age effect is found (N-children: ($F(1,42)=8.035; p<.007$; R squared .158; Eta squared .172; PI-children ($F(1,114)=13.075; p<.000$; R squared .100; Eta squared .132)\(^{31}\). Just as in the conversational genre, PI-children have more

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\(^{30}\) ANCOVA with total number of embedded clauses as dependent variable, total number of narrative T-units as covariate and age (4-6-8yrs) as independent variable is used in the N- and PI-children.

\(^{31}\) One-way ANCOVA with total number of embedded clauses with a subordinating conjunction as dependent variable, total number of narrative T-units as covariate and age (4-6-8yrs) as independent variable is used in the N-children.

One-way ANCOVA with total number of embedded clauses with a subordinating conjunction as dependent variable, total number of narrative T-units as covariate and age (4-6-8yrs) as independent variable is used in the PI-children.
difficulties to produce an explicit complementizer at the clausal boundary in the narrative than same-aged N-children (see 8.5).

Table 9.17

<table>
<thead>
<tr>
<th>Subordinating conjunctions</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>4yrs</td>
<td>2.00</td>
<td>3.7%</td>
</tr>
<tr>
<td>5yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6yrs</td>
<td>3.40</td>
<td>7.6%</td>
</tr>
<tr>
<td>7yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8yrs</td>
<td>7.67</td>
<td>14.3%</td>
</tr>
<tr>
<td>9yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>4.36</td>
<td>8.5%</td>
</tr>
</tbody>
</table>

It was impossible to use statistics to compare the use subordinating conjunctions, in particularly the additive, adversative, temporal and causal relationships (Scheper, 1996), since only a very small number of such conjunctions were found (see Appendix 9d and 9e). These findings are in line with the expression of more complex subordinating relations in narratives of normally developing children. It is only at age nine that normally developing children start to produce causal and temporal subordinating conjunctions (Berman and Slobin, 1994). Only a few relative clauses were used productively by the PI-children, as was also found by Aarssen (1996). Switching in perspective between the main clause and its relativized clause is not further analysed, since the instances were too few.

With age PI-children show a better performance in using correctly formed embedded clauses in order to express the story-line \( F(5, 113)=8.450; p<.000 \)\(^{32}\), in both genres a significantly linear development was observed in the PI-children (see also 8.5) (Table 9.18). Older PI-children are more aware of the obligatoriness of producing a complementizer, although these PI-children still have 14% morphological/syntactic marked embedded clauses and they cannot establish a variety of semantically subordinating relations.

\(^{32}\) One-way ANCOVA with total number of correctly formed embedded clause as dependent variable, total number of narrative T-units as covariate and age (4-5-6-7-8-9yrs) as independent variable is used in the PI-children.
Comparing the two genres, we found that the performance in using correctly formed narrative embedded clauses is similar to the performance in the conversation, resulting in a significant linear correlation ($r=.425; p<.000$)\(^{33}\), as is also shown in Figure 9.14. PI-children produce an average of 9% embedded clauses in the narrative compared to 10% in the conversational interview. In the four-year-old PI-children only 38% of the produced embedded clauses are correctly formed, whereas in the oldest PI-children approximately 84% is produced correctly. Nevertheless 16% of the clauses are ungrammatical even at age eight because a subordinating conjunction is missed out.

---

\(^{33}\) Pearson's pmc coefficient is used to measure the correlation of the percentage correctly formed embedded clauses (related to the percentage of embedded clauses) in the narrative and conversational genre in the 120 PI-children.
This finding indicates that the older PI-children can express multiple ideas and feelings in grammatically well-formed embedded clauses better than the younger PI-children. However, the results in the both genres show that PI-children as a group have not overcome their difficulties in explicating the functional head-category complementizer, i.e. the use of subordinate conjunctions. Relative clauses were observed as rarely in the narrative as in the conversation, probably due to their structural complexity in Dutch: they require agreement in number with the head noun (except for ‘waar’ (where) and ‘wat’ (what)) and they need a different word order than in the clause.

9.6.3 Conclusion: packaging morphologically/syntactically in two genres
The results of the analysis of the Frog story confirms in general that the narrative is a more complex genre that makes an even greater demand on morphological/syntactic and semantic/pragmatic skills of the PI-children.

In general, PI-children as a group show problems in using morphological/syntactic structures to establish co-referential cohesion and connectivity between two or more clauses (see 13.4 and 14.4). This is most prominent in the narrative genre, but it is also evident in the conversational genre. PI-children show problems in establishing connectivity in the interview and the narrative: first, they use null arguments as a local grammatical device, but they employ this cohesive strategy even less often in the more complex narrative than in the conversation. Moreover, the number of ungrammatical missing subjects and objects indicates that PI-children have problems with appropriate morphological/syntactic and semantic/pragmatic rules to link null arguments appropriately to the preceding clause. Second, PI-children too frequently fail to connect the main clause with the reduced clause with an explicit obligatory coordinate conjunction, such as ‘en’ (and), ‘of’ (or) or ‘maar’ (but) and they make errors in leaving structural information implicit in the reduced clause. This problem with expressing the dependency relation between the main and the reduced part is comparable in both genres. Third, PI-children also too frequently lack obligatory coordinate or subordinate conjunctions at the clausal boundary, indicating
that they have problems with spelling out the functional head category complementizer and show problems with the word order in the subordinated clause in both genres in the narrative as well as in the conversation. The performance of PI-children to use hierarchically, organized representations of events by means of embedded clause is comparable in both genres.

To conclude, these results indicate that PI-children cannot always correctly connect two main clauses or a main clause and a dependent clause at a local level; this is true in both the conversation and the narrative genre. The problems of the ability to package morphologically/syntactically in PI-children in both genres is probably related to their difficulties in identifying the obligatory kernel information of the clause, such as the verbal predicate and its arguments, and to their difficulties in expressing multiple ideas compared to the same-age N-children. Additionally, also difficulties in semantics/pragmatics (see 14.5 to 14.7) in PI-children are involved in establishing referential connectivity in the narrative genre. Processing problems could influence the ability of complex morphological/syntactic packaging negatively (see 2.3.1).

9.7 General conclusions: a genre comparison of morphological/syntactic abilities

The ability to use morphologically/syntactically hierarchically organized structures is a prerequisite to achieve thematic connectivity, constructing chunks of discourse subordinated to an overall plot-motivated theme. Previous research suggests that children can use this strategy without making errors from age nine onwards. PI-children as a group show, at a local level, too many ungrammatical packaged clauses due to missing obligatory verbs and their arguments, errors in past tense marking and subject-verb and determiner-noun agreement errors in the narrative, even slightly more than in the interview.

The results in the narrative genre related to temporality show that a subgroup of PI-children tend to lack lexical verbs, a comparable performance to the conversation. PI-children also use many non-transitive verbs, such as intransitives and copula, giving only static descriptions instead of related events and treat each scene as an isolated event in their narratives. Instances of mixed anchoring tense in a subgroup of PI-children also indicate a lack of overall temporal narrative organization, although PI-children do use more past tense forms in the narrative than in the conversational genre.

The results related to transitivity show that the distribution of the different verb frames differs in both genres. PI-children use more intransitives in the narrative as opposed to the interview. On the other hand, in the conversational genre PI-children use more obligatory transitive verbs in the interview as opposed to the narrative. These are necessary to narrate this particular story in an informative, goal-directed way, yet only a third of the verb types used in the narrative involve transitive verb frames compared to half in the conversational genre. This clear difference in performance is probably due to the relatively more complex genre of the narrative. Additionally, low verb complexity is widespread among PI-children and is more obvious in the narrative than in the conversational genre. The PI children make
relatively more use of split verbs and of semantically light verbs in the narrative genre. 

Agreement relations are also affected more in the narrative than in the conversation. PI-children make more subject-verb agreement errors in which the subject-referent stays unclear; they also frequently leave the determiner unrealized and use bare nouns instead.

PI-children produce instances of ungrammatical missing subjects and objects relative to their age in the narrative as was found in the conversational genre. Frequently neither the agent nor the patient of the action is realized, resulting in the absence of local perspective of the event. This type of narrative organisation is restricted to the most local level of the contents of individual pictures, characteristic for phase 1 of the developmental path to thematic connectivity (see developmental order 9.6.1).

The results related to the ability to package morphologically/syntactically show that PI-children as a group organize their discourse temporally using discourse topic drop, conjunction reduction constructions and embedded clauses. The narratives are still often locally organized indicating they are in phase 2 of the development of thematic connectivity (Berman and Slobin, 1994) (see 9.1). However, a small subgroup of PI-children has problems with using an explicit complementizer at a clausal boundary and therefore do not establish connectivity, indicative of phase 1. Thus, the analysis of morphological/syntactic devices indicates that a subgroup of PI-children is still in phase 1 or 2 of the development of thematic connectivity (see 9.1), and not in the final phase of development, phase 3, in which narratives are causally structured in terms of a hierarchically organized goal plan of action (see also 14.3). To conclude, PI-children show clear morphological/syntactic difficulties in narrating a story such as the Frog story and more difficulties in general than in the conversation.
10 Semantic/pragmatic language abilities in the conversational interview and narrative genre

Claudia Blankenstijn

10.1 Introduction
The acquisition of morphological/syntactic rules is more or less complete around the age of six years and the number of errors that children make have decreased to 'normal' proportions, that is the level of performance errors from adults (Van den Dungen and Verbeek, 1994, 1999) (see 4.1). The acquisition of semantic and pragmatic rules takes a much longer time, there being a major development from age six onward during the school years. The acquisition of some semantic and pragmatic rules is not even finished by adulthood (e.g. Smith and Leinonen, 1992; Ninio and Snow, 1996; Roelofstra, 1998:180). In this study, only those semantic aspects that have a direct effect on the pragmatic rules for language use are incorporated. For instance, when pragmatic violations are caused by a semantic disability to specify referents, subjects (persons and animals), objects (things), actions or events. This area will be referred to as semantics/pragmatics (see 3.5).

Our goal is here to understand how the Dutch-speaking PI-children develop semantic/pragmatic abilities in the conversational interview genre, i.e. an interview is a specific type of conversation, and narrative genre. This involves the investigation of whether and how frequently PI-children make specific semantic/pragmatic violations compared to the N-children. Aspects that will be considered are, for example, taking very long 'thinking' pauses when asked questions, interrupting the interviewer, failing to answer questions by giving no or only minimal responses, showing unwillingness to engage in communicative interaction, trying to change roles by expressing informative requests, being unable to tell anecdotes, being unable to detect and repair misunderstandings, ignoring the questions asked, frequently shifting the topic of conversation, thus being unable to establish and maintain topics, giving another answer than intended or asked for, engaging in odd associations and reasoning, telling the same information twice, leaving out essential or giving ambiguous information, using unclear reference, being unable to make appropriate lexical choices, talking irrelevantly and about things the listener shows no interest in, assuming no prior knowledge, and so on (e.g. Fey and Leonard, 1983; Prutting and Kirchner, 1983; Adams and Bishop, 1989; Bishop and Adams, 1989; McTear and Conti-Ramsden, 1992; Smith and Leinonen, 1992; Ninio and Snow, 1996).

This study is limited to the analysis of only the most frequent violations that can be found in the conversational interview and narrative genres. For instance, not included here are: using intimate address forms with older people or superiors, dominating the conversation, expressing direct commands instead of polite requests, failing to greet people or not looking at the communication partner (e.g. Brown and Levinson, 1978). Violations of politeness rules were not the main focus, nor
sentence internal pauses and mazes\(^1\) (Fletcher, Garman, Schelleter and Stodel, 1986). We did not include either non-verbal difficulties, for instance, abnormal body positioning, such as sitting under the table and with your back to the interviewer, although this did happen in interviews with Pi-children. The analysis of foul language that is found to be typical for some Pi-children, especially those with externalizing Pi (Gresham, MacMillan and Bocian, 1996) was also not included, since it was not part of the semantic/pragmatic model we used (Roelofs, 1996, 1998).

It is obvious that children have to learn more than only avoiding pragmatic violations. In the conversational interview genre, children have to acquire the ability to answer many different types of questions, for example about friends, games and pets and so on. These questions change in complexity with age. The questions asked by the interviewer can vary in form and content from simple yes/no?, where? or when? questions to questions that ask for a motivation why? or a manner description how? The pragmatic function of a request for information can also vary from direct and overt to more indirect and covert. A direct and overt question has an interrogative form not only linguistically marked by its inversion of word-order and starting with a question-word, but also marked with a clear rising intonation pattern. An indirect and more implicit request can have the form of a declarative that functions as a prompt for further information. Thus, children have to learn to deal with questions that vary in form, content and directness, the complexity depending on the interviewer's style. In the narrative genre, the complexity level stays the same: all children have to learn to take a long turn without any help, to embed the picture-elicited Frog story in time, to tell the complete overall plot line and to establish clear reference. Analysis of language use in both genres gives deeper insight into the language difficulties in the area of semantic/pragmatics, since these tasks require different skills. They also place demands on children that resemble everyday performance demands.

The general picture for normal semantic/pragmatic development is that as the N-children grow older, the conversational turn will become longer, they can answer more clearly and more explicitly and keep track of the conversational topic. The semantic/pragmatic language skills in both genres improve, and the frequency of violations, such as mentioned above, decreases (e.g. Roelofs, 1998). Here we will consider the relative speed of semantic/pragmatic development and the kind of deficiencies shown by the Pi-children compared to the N-children.

In the field of semantics/pragmatics no clear adult norms are available for most rules, that is in terms of 100% correct behaviour. The application of the frequency criterion for acquisition, 90% occurrence in obligatory contexts (Brown, 1973), is rarely possible.

---

1 Non-fluent phonological, lexical or structural sentence-internal repetitions and/or revisions are called 'mazes' (Fletcher, Garman, Johnson, Schelleter and Stodel (1986)).
In general, semantic/pragmatic rules are applied less strictly than morphological/syntactic rules (Bax, 1995). Only recently Roelofs (1998) has provided more information on the semantic/pragmatic development in school-aged Dutch-speaking N-children. These results provide a normed reference group for comparison with PI-children. In this study norm or qualitative referenced comparison is sometimes preferable to the use of a quantitative frequency criterion. To give an example: it is not appropriate for children to ask requests for information when they themselves are questioned in the conversational interview genre. We could therefore decide that only a few instances of this inappropriate semantic/pragmatic behaviour indicates the existence of broader semantic/pragmatic deficiencies.

Isolated instances of deviant semantic/pragmatic behaviour are probably as important as larger numbers of semantic/pragmatic behaviours that share common elements and features. When taken together, these relatively isolated instances may form some sort of regularity or consistency in a deviant pattern. For instance, long pauses between turns, interruptions and missed turn chances, whereby each occurs for less than 10%, can all three contribute to the disturbance of smooth turn taking and accumulate to 30% disruptions in smooth turn taking. This is comparable to the relative infrequency of different types of missing obligatory sentence elements, but which taken together form a regular deviant pattern in the area of morphosyntax. Especially in the field of semantic/pragmatics, presenting taxonomies for clinical assessment on both quantitative and qualitative grounds seems to be the best option. (see for an overview Bloom and Lahey, 1987:325-330). This seems the only way to develop more fine-grained assessment tools in the future.

Children with semantic-pragmatic LI have great trouble using language socially, in ways that are appropriate or typical of same-aged N-children. Semantic/pragmatic deficiencies are usually first noticed in LI-children in the age range of six to twelve years and can become increasingly obvious as LI-children's morphological/syntactic skills improve (e.g. Bishop, 1989; Smith and Leinonen, 1992). Most investigations have confirmed that English-speaking PI-children with different types of psychiatric impairments in general frequently have moderate to severe semantic/pragmatic difficulties (Audet and Tankersley, 1999; Donahue, Hartas and Cole, 1999; Westby, 1999). From pilot studies for this project in Dutch it emerged that the children show differences from normal children in their semantic/pragmatic behaviour (Kolthoff, 1989; Ran and Smits, 1990; Velgersdijk, 2001) but their semantic/pragmatic difficulties have been described in rather general terms. The study of co-referential cohesion (Dijkhuis, 1994) and semantic (dis)abilities (Polisenska, 2003) also showed some problems. From these studies, however, it is not clear whether and how specific aspects, such as turn taking or coherency, are affected in many PI-children and whether they show delayed or atypical behaviour in the semantic/pragmatic language area (see also 1.1 and 4.1).

Children with semantic/pragmatic disorders are also called 'children with semantic-pragmatic deficit syndrome' (Rapin and Allen, 1983), 'children with semantic-pragmatic disorder' (e.g. McTear and Conti-Ramsden, 1992) or, more recently,
'children with pragmatic LI' (PLI; Bishop, et al., 2000). From the developmental literature there appears to be a continuum, with these LI-children with semantic/pragmatic disorders on the one hand and PI-children on the autistic spectrum with similar communication problems on the other (Wing, 1988; Rapin and Allen, 1987; Bishop, 1989; Bishop and Rosenbloom, 1987; Smith and Leinonen, 1992; Van Berckelaer-Onnes, 2002). This means that there are PI-children with LI in which the limited use of language appears to be a reflection of general withdrawal from interpersonal contact. On the other hand, there are LI-children with additional symptoms of PI who are characterized as having limited interpersonal contact. They may be withdrawing from contact because of difficulty in the area of semantics/pragmatics (e.g. Bloom and Lahey, 1978:598). Groups of PI-children with semantic/pragmatic LI that can be placed on such a continuum, are seen as having difficulties in acquiring specific semantic/pragmatic rules needed to cope with everyday social interaction (e.g. McTear and Conti-Ramsden, 1992) (see 1.3.2 and 1.3.3).

Recently, however, most researchers claim that the areas of morphology/syntax and semantics/pragmatics are both affected in most PI-children with different types of internalizing and/or externalizing disorders (Van Berckelaer-Onnes, 1997; Cohen et al., 1998; Cohen et al., 2000; Beitchman et al., 2001). As the previous Chapters 4 to 9 have shown, it is clear that most Dutch-speaking PI-children, although not all, are observed to have morphological/syntactic difficulties in both genres. They produce too many ungrammatical contributions that are often not properly informative and difficult to understand. Some semantic/pragmatic violations may be related to problems on the level of morphology/syntax (e.g. Kolthoff, 1989; Ran and Smits, 1990; Mills and Tso, 1991; Mills, Pulles and Witten, 1992; Dijkhuis, 1994). For instance, unclear reference (see 13.4 and 14.4) can be related to – and even caused by – missing obligatory grammatical arguments (see 5.3 and 5.4). As discussed earlier (see 4.1) it is important for language acquisition theory to explore the interrelationship between specific morphological/syntactic and semantic/pragmatic phenomena, and the interface between these two language areas. Specific populations, such as children with (specific) psychiatric disorders, can offer even more insight into this relationship. The main aim of this study is however to develop a sub-classification of PI-children on the basis of more fine-grained characteristics of language performance.

As stated earlier (3.5), we cannot compare the PI-children to the N-children from the STAP-population on the general measures for semantic/pragmatic incorrectness. The population used for comparison is taken from the Roelofs' study (Roelofs, 1998). In Table 10.1 we present the set of variables used to study semantic/pragmatic conversational and narrative abilities. In order to be able to compare the results in the PI-children with the N-children from the Roelofs-population, we explored turn taking abilities under the heading of the structure of conversation (Chapter 10), such as the ability to produce long turns (10.4), the detection of brief and excessive talkers (10.5) and the ability to take turns smoothly (10.6). Under the
heading of form-function (Chapter 11) we investigated the ability to be responsive (11.2 tot 11.5) and repair mis-communications (11.6). Under the heading of the content of the conversational interview genre, we looked at the ability to transmit relevant information (Chapter 12 and 13), such as the ability to manage the conversational topic (12.1), and the ability to link contributions coherently (12.3 to 12.8) and cohesively (13.2 and 13.4), with special emphasis on the ability to establish clear reference (13.5 to 13.8). The semantic/pragmatic ability to use linguistic expressions to achieve coreferential cohesion is one of the major and very important areas of development during the school years. Making clear to others which person, animal, thing or event one is talking about is a necessary condition for good conversation and narrative. This development is strongly connected to the social-cognitive ability to take into account the listener's perspective, being part of the development of a Theory-of-Mind (see 2.3.3).

In the narrative genre, we will look at the PI-children's ability to fulfil the narrative task, taking into account the fact that they have to tell a picture-elicited story on their own without any help of the interviewer (see 3.4.1, 9.1 and 14.1). More important, we will investigate how the PI-children learn to express the time-embedding of the story (14.2), the overall plotline (14.3) and how they establish clear reference (14.4 to 14.7). A genre comparison is only made for the ability to establish clear reference (14.8) (see Table 10.1).

For each of the abilities a hierarchical coding system of subordinate coding categories was developed that specify a certain variable. Each semantic/pragmatic variable will be discussed and motivated in the following chapters. The coding categories represent the difference between semantically/pragmatically appropriate versus inappropriate communicative behaviour, where possible. As stated in 3.6, we follow the Explanatory Criterion (Burisch, 1984) that uses significant differences in group effects to classify deviant from normal semantic/pragmatic behaviour. As pointed out earlier (see 3.5), however, the group differences found on one specific variable in the area of semantics/pragmatics cannot exclusively justify the classification of a semantic/pragmatic disorder. It is only the combination of different deviations from the standard on more measures that can point towards semantic/pragmatic impairment.

In Table 10.1, the numbers 10 to 14 refer to the specific chapters that present the results of a specific variable. Each section contains a motivation of the specific linguistic variable; the research variable is then defined and operationalized. Finally the results related to the specific semantic/pragmatic variable are presented. Each section will be rounded off with concluding remarks. Finally, in section 13.9 the general conclusions are formulated on the basis of the results of the complete semantic/pragmatic analysis of the conversational interview genre, and in section 14.9 the same will be done with respect to the narrative genre.
Chapter 10  Semantic/Pragmatic conversational development

Table 10.1  The complete set of main variables for the analysis of semantic/pragmatic abilities in the conversational interview and narrative genre

<table>
<thead>
<tr>
<th>Structure conversation</th>
<th>Form-Function conversation</th>
<th>Content conversation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>10 Turn taking abilities</strong></td>
<td>11 The ability to be responsive and repair</td>
<td>12/13 The ability to transmit relevant information</td>
</tr>
<tr>
<td>10 The ability to produce long turns</td>
<td>11 The ability to be responsive</td>
<td>12 The ability to manage the conversational topic</td>
</tr>
<tr>
<td>Communicative contributions</td>
<td>Missed turn chances</td>
<td>Topic introduction</td>
</tr>
<tr>
<td>Turns</td>
<td>Minimal responses</td>
<td>Topic continuation versus link</td>
</tr>
<tr>
<td>MLT and LLT</td>
<td>Function second pair parts children</td>
<td>Topic hold</td>
</tr>
<tr>
<td>Long Turns</td>
<td>Extended discourse with a narrative character</td>
<td></td>
</tr>
<tr>
<td>Brief and Excessive talkers</td>
<td>11 The ability to repair</td>
<td>12 The ability to follow the Maxims</td>
</tr>
<tr>
<td></td>
<td>Repairs</td>
<td>Maxim of relation</td>
</tr>
<tr>
<td></td>
<td>Requests for clarification</td>
<td>Maxim of relevance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maxim of quantity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maxim of quality</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maxims of manner</td>
</tr>
<tr>
<td>10 The ability to take turns smoothly</td>
<td></td>
<td>13 The ability to use cohesive devices</td>
</tr>
<tr>
<td>Types smooth turn exchanges</td>
<td></td>
<td>Clausal Ellipses</td>
</tr>
<tr>
<td>Types non-smooth turn exchanges</td>
<td></td>
<td>Conjunctions and subfunctions</td>
</tr>
<tr>
<td>Gap lengths</td>
<td></td>
<td>Co-referential cohesion</td>
</tr>
<tr>
<td>Types of speech overlap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure narrative</td>
<td>Form-Function narrative</td>
<td>Content narrative</td>
</tr>
<tr>
<td>14 Narrative task</td>
<td>14 The ability to tell a narrative</td>
<td></td>
</tr>
<tr>
<td>Narrative contributions</td>
<td>Embedding narrative in time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Narrating the plot</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Co-referential cohesion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Genre comparison</td>
<td></td>
</tr>
</tbody>
</table>

10.2  Turn taking: the ability to produce long turns and to take turns smoothly

Since the turn taking system is more constrained for the conversational interview genre than for every-day conversations, we may expect that the interview task somehow reduces difficulties in turn taking (e.g. Greatbatch, 1988). However, it may still be problematic enough for some children. A good interview is characterized by short turns produced by the interviewer on the one hand and by smoothly taken, long turns produced by the N- and PI-children on the other. It is possible that smooth turn taking precedes the production of longer turns developmentally, since it is more challenging to produce longer meaningful turns than to work out the timing of exchanges (e.g. McTear and Conti-Ramsden, 1992). It is not until four years that children start to talk about past events and everyday life experiences in longer turns and with a precise timing of turns (McTear, 1985).
Turn taking begins quite early in life. From age two on, children learn to speak about the non-present (Greenfield and Smith, 1976; Ninio and Snow, 1996) and to express utterances in longer stretches of talk (Bloom and Lahey, 1978), before they can combine these two abilities. When four-year-old N-children produce longer turns, they first need the support of others to do so, but from age five/six on N-children become able to produce longer conversational turns without prodding or feedback (Karmiloff-Smith, 1986; Peterson and Dodswordth, 1991; Schober-Peterson and Johnson, 1993). These longer conversational turns are called extended discourse in the developmental literature (Ninio and Snow, 1996).

However, although in general it can be supposed that as N-children grow older they develop a feeling for smooth turn taking, little is known about the relative speed of the development of turn taking abilities and the frequency of occurrence of non-smooth turn alternations in school-aged N-children. For instance, in interviews with the 75 Dutch-speaking N-children it was only partly confirmed that they become better turn takers with age, since speech overlap and gaps (pauses) between turns did not decrease with age in the age range studied (Roelofs, 1998).

Even less is known about the development of turn taking abilities in school-aged LI- and PI-children. Some investigators report that LI-children do not appear to have difficulties in turn allocation itself (McTear and Conti-Ramsden, 1992), but others have observed that turn taking failures, such as long gaps and speech overlap between turns, especially interruptions, frequently occur in some LI-children, but not in all (Rosinski-McCledon, and Newhoff, 1987; Rapin and Allen, 1987; Friel-Patti, 1992). Others report smooth turn taking but low Mean Length of Turn (MLTs) in English-speaking LI-children (Fey and Leonard, 1983, Craig and Evans, 1993) and younger Dutch-speaking LI-children (Van Balkom, 1991). Most frequently, LI-children, especially LI-children with semantic/pragmatic disorder, are observed to have difficulties in producing longer turns and in taking turns smoothly (Johnson, Johnston and Weinrich, 1984; Adams and Bishop, 1989; Bishop and Adams, 1989; Craig and Evans, 1989).

Similar turn taking problems are signalled in PI-children (Hobson, 1986; Baltaxe and Simmons, 1988; Audet and Tankersley, 1999; Westby, 1999). We know that autistic and schizophrenic PI-children (who are excluded from this study) have severe turn taking disabilities (Baltaxe, 1977). Turn taking difficulties are also observed in PI-children on the autistic spectrum (Fay and Schuler, 1980). For instance, these PI-children (Bernard-Opitz, 1992; Rapin, 1996) and PI-children with ADHD are frequently observed to talk excessively (DSM-IV-TR, APA, 2000:85-93). These 'chatter-box' PI-children remain in the speaker role for too long and are considered bad conversationalists, since they neither display attentiveness nor give others opportunity to speak (Bishop and Adams, 1989; McTear and Conti-Ramsden, 1992; Rapin, 1996).

Although we might expect some deficiencies in the 120 PI-children, it is not exactly clear how and to what extent smooth turn taking and turn length are affected. Some
PI-children might be unable to produce long turns, whereas others might keep on talking. Children who produce too many short turns are named 'brief talkers' and children who produce an extremely long, but incoherent turn are further referred to as 'excessive talkers' (see 10.5).

In the following, we will explore the PI-children's turn taking abilities. First, we will describe the ability to produce long turns (10.4) and detect brief and excessive talkers (10.5). Then, we will explore the ability to take turns smoothly by counting the amount of non-smooth turn exchanges, i.e. the amount of gaps (pauses) and speech overlap between turns (10.6), ending with the conclusion (10.7). But first, we start with an introduction of the most basic units of the semantic/pragmatic analysis in the conversational interview genre: communicative contributions and turns (10.3).

10.3 Communicative Contributions and Turns

10.3.1 Research questions, definitions and operationalisations

Since communicative contributions and turns are the most elementary units of transcription, segmentation and analysis, their influence on the analysis of many different types of semantic/pragmatic abilities must not be underestimated. Here, we want to know whether the number of communicative contributions and turns in interviews with PI-children are comparable to the amount in interviews with N-children. And, is there comparable development with age?

Communicative contributions (CC) are all verbal plus a small selection of non-verbal contributions that can vary in form, length, content and function. The boundaries between communicative contributions (within a turn) are largely based on STAP (Van den Dungen and Verbeek, 1994, 1999): the morphological/syntactic and semantic unity of one contribution and the completeness of its intonation contour set the boundaries between contributions. However, we had to make some adjustments on STAP following Roelofs (1998). In what follows we make explicit what linguistic information is part of a specific type of communicative contribution.

Each interview must minimally contain 50 communicative contributions from the child in the form of a T-unit, according to STAP (Van den Dungen and Verbeek, 1999) (see 3.3 and 4.2). The focus here is on the semantic/pragmatic analysis of a semi-structured interview between adult and child; we therefore analysed more material than these 50 T-units. For instance, unlike STAP, (non-verbal) yes/no answers (see 11.7) and elliptical answers (further named clausal ellipsis; see 8.3 and 13.2) are coded as separate communicative contributions. Other communicative gestures, such as points, are transcribed but not further analysed. The non-verbal communicative contributions of the interviewer were not accessible, and therefore not coded, because the N- and PI-interviewers were not in camera.
Unlike STAP, that only includes conversational contributions on a topic outside the here and now, we analysed the first communicative contribution about the here-and-now (mostly coded as unmarked topic shift; see 12.3), whereas the following, successive contributions about the here-and-now were only transcribed and not further analysed.

We also analysed breaks as missed turn chances (see 11.2). Breaks are communicative contributions that are unfinished (without a complete predicate) and therefore mostly (partly) unintelligible communicative contributions, due to pronunciation or speech-rate problems of the children, background noise or speech overlap. However, totally unintelligible communicative contributions expressed by the N- and PI-children were excluded from further analysis.

We coded feedback as separate communicative contribution, but interjections, such as 'do you know', 'look' or 'listen' not. Feedback is mostly expressed by the interviewer, such as 'hmm', 'yes' or 'no', and is analysed as a signal of the N- and PI-interviewers' communicative support (see 11.1). The different types of communicative contributions included in all semantic/pragmatic analyses are set out in Table 10.2.

Table 10.2 The coding categories of the variable communicative contribution

<table>
<thead>
<tr>
<th>Communicative contributions Child</th>
<th>Communicative contributions Interviewer</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 50 T-units (see 4.2)</td>
<td>- T-units</td>
</tr>
<tr>
<td>- non-verbal yes/no answers (nods/ head shakes)</td>
<td>- verbal yes/no answers and feedback</td>
</tr>
<tr>
<td>- verbal yes/no answers and feedback</td>
<td>- elliptical answers (clausal ellipsis)</td>
</tr>
<tr>
<td>- elliptical answers (clausal ellipsis)</td>
<td></td>
</tr>
<tr>
<td>- breaks</td>
<td></td>
</tr>
</tbody>
</table>

Younger children (both N- and PI-children) and PI-children are expected not to have the semantic/pragmatic competence needed to give elaborate answers. For instance, they frequently interpret questions in a more literal way (Example 1).

Example 1 Literal interpretation (PI-child; 4:8)

**Interviewer:** kun je wat over je zusje vertellen?
(can you tell me something about your sister?)

**Rick:** ja.
(yes)

These N- and PI-children are therefore expected to produce more extra communicative contributions that have the form of yes/no answers or elliptical answers in addition to the 50 T-units in each conversational interview (see 3.3 and 4.2.1).
A turn (T) starts when a speaker speaks and continues until the speaker stops. A turn can have different forms (Table 10.3).

Table 10.3 The coding categories of the variable turn (for both interviewer and child)

<table>
<thead>
<tr>
<th>Turns</th>
</tr>
</thead>
<tbody>
<tr>
<td>- (non) verbal yes/no answer (+ one or more T-units)</td>
</tr>
<tr>
<td>- elliptical answer (+ one or more T-units)</td>
</tr>
<tr>
<td>- (non) verbal yes/no answer + elliptical answer (+ one or more T-units)</td>
</tr>
<tr>
<td>- one or more T-units</td>
</tr>
</tbody>
</table>

*The contributions between brackets (): are optional

The boundaries between turns are not exactly based on the model of Sacks, Schegloff and Jefferson (1974) (see for a critical review Roelofs, 1998:28-29), but on STAP (Van den Dungen and Verbeek, 1994, 1999) and our adjustments on STAP, following Roelofs. The boundaries between contributions as defined above are also applied with respect to the last contribution of the previous turn and the first contribution of the successive turn. However, in order to analyse the ability to take turns smoothly, we based our analysis on Jefferson's (1989) assumption that taking turns smoothly involves avoiding gaps longer than 1 second and speech overlap between turns (see 10.6).

From Table 10.3 we see that a turn can contain one or more of the following communicative contributions: a single (non)verbal yes/no answer (Example 2); a single elliptical answer (Example 3); a T-unit (Example 4) or a combination of contributions, such as three successive T-units (Example 5).

**Example 2**  A single non-verbal 'no' coded as one turn (PI-child; age 7:8)

**Interviewer:** hebben jullie thuis huisdieren? (do you have pets at home?)
**Emiel:** Ø (shakes no)

**Example 3**  A single elliptical answer coded as one turn (PI-child; age 7:4)

**Interviewer:** hoe heet jullie poes? (what is the name of your cat?)
**Michiel:** → <eh> Casper.

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2 See Appendix 4a for transcription symbols
Example 4  
A single T-unit coded as one turn (Pl-child; age 7;4)

Interviewer:  
nou vertel eens wat over de vissen.  
(now tell me something about the fish)
Maaikel:  
<hm> die krijgen gewoon eten.  
(<hm> they just get food)
Interviewer:  
ja.  
(yes)

Example 5  
Three communicative contributions coded as one turn (Pl-child; age 7;9); conversational topic: games with sisters

Interviewer:  
wat doen jullie dan?  
(what do you do so?)
Mark:  
ik speel heel vaak met me kleine zusje.  
(I very often play with my little sister)
Mark:  
gaan we heel vaak tekenen.  
(we very often draw)
Mark:  
en met me grote zus ga ik heel vaak met de bal overgooien.  
(and with my elder sister I very often play with the ball)

Other combinations of these categories that form one turn are also possible, for instance, one turn contains one non-verbal yes/no answer plus one elliptical answer plus one T-unit (see Table 10.3). Since the analysis of turn taking abilities is based on the segmentation of communicative contributions into turns, in interviews with a higher number of communicative contributions also a higher number of turns is expected. Namely, if N- and Pl-children express many (non)verbal yes/no answers and/or elliptical answers but relatively few Long Turns (= three successive T-units or more), the interviewer must ask more questions until the 50th T-unit is reached. The interview is then relatively long and the transmission of information progresses relatively slowly (Example 6).

Example 6  
Part of a relatively long interview (Pl-child; age 6;10)

Interviewer:  
heb je huisdieren thuis?  
(do you have pets at home?)
Danny:  
#1 ja.  
(#1 yes).
Interviewer:  
ja?  
(yes)
Danny:  
ja  
(yes)
Interviewer:  
vertel er eens over.  
(tell me about it)
Danny:  
een hamster.  
(a hamster)
In Example 6, the PI-interviewer takes three turns and the PI-child takes three turns, but no single T-unit was elicited. On the contrary, if N- and PI-children produce more extended discourse, fewer questions have to be asked and thus fewer turn alternations are involved. In that case, the interview is less time consuming, because more is said in less time (Example 7).

**Example 7**  
*Part of a relatively short interview (PI-child; age 9.5)*

**Interviewer:** heb je huisdieren thuis?  
(do you have pets at home?)

**Paul:** ja.  
(Yes)

**Interviewer:** ik heb veel vissen en twee katers.  
(tell me about it)

**Paul:** I have many fish and two tom-cats.

**Paul:** vertel er eens over.  
(well, one follows you about the whole day)

**Paul:** en de andere, die jaagt veel.  
(and the other one hunts a lot)

In Example 7, two turns of the PI-interviewer elicit two turns of the PI-child, that consist of 1 verbal yes/no answer plus 1 T-unit (turn one), and two T-units (turn two). Although all language material in the interviews was divided into contributions and turns for both N- and PI-interviewers and N- and PI-children, our main interest here concerns the development of turn taking abilities in the PI-children as compared to the N-children (Roelofs, 1998). Therefore, we will only present the results of the N- and PI-children.

### 10.3.2 Results: Communicative Contributions and Turns

Contrary to our expectation, we found that the PI-children produce significantly fewer communicative contributions\(^3\) than the N-children, due mainly to the four- and six-year-old N-children (see Figure 10.1).

With increasing age, the N- and PI-children produce significantly fewer communicative contributions\(^4\) until the limit of 50 T-units is reached. This means not only that younger N- and PI-children produce more communicative contributions in the form of a yes/no answer or elliptical answers (or both) to arrive at 50 T-units, but also that the older N- and PI-children answered more in (successive) T-units. As a consequence, in both the N- and PI-children the interviews become shorter and less time consuming with age. A relatively long interview took 40 minutes and a short interview 20 minutes on average.

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\(^3\) ANOVA: group effect $F(1,165)=4.04$, $p<0.046$; age effect $F(4,165)=8.95$, $p<0.001$ (nine-year-old PI-children excluded).

\(^4\) One-way ANOVA: N-children $F(4,70)=5.52$, $p<0.001$; Eta squared $.24$, $R^2$ .18; PI-children $F(5,114)=6.11$, $p<0.001$; Eta squared .21, $R^2$ .18 (nine year-old PI-children included).
Turn taking abilities

Figure 10.1  The mean total number of communicative contributions expressed by 75 N-children (Roelofs, 1998) and 120 PI-children in the conversational interview genre

When we compare the number of turns expressed by the N- and PI-children\(^5\) (Figure 10.2), we observed – contrary to our expectations and despite the relatively higher amount of turns produced by the six-year-old N-children – no significant group effect.

Figure 10.2  The mean total number of turns expressed by 75 N-children (Roelofs, 1998) and 120 PI-children in the conversational interview genre

\(^5\) ANOVA (nine-year-old PI-children excluded)
This means that the N-children produce not only significantly\(^6\) more very short yes/no and/or elliptical answers, but also produce more long turns than the PI-children, so that the mean total number of turns becomes equal in both groups. With age the number of turns linearly decreases\(^7\) in both N- and PI-children at a similar rate. Thus, with age the PI-children express fewer short answers and more long turns, comparable to the N-children (see also Roelofs, 1998:80).

10.3.3 Conclusion: Communicative Contributions and Turns

We conclude that, contrary to our expectations, the N-children needed more communicative contributions than the PI-children to arrive at 50 T-units, but produced a comparable amount of turns. With age we see a similar decrease in communicative contributions and turns, whereby the developmental rate of the decrease is the same in both N- and PI-children. Thus, the interviews are on the whole comparable in quantity with respect to the number of turns. Turns are further analysed according to their length, as will be presented in the next section.

10.4 The ability to produce Long Turns

10.4.1 Research questions, definitions and operationalisations

In order to explore the ability to produce turns of a substantial length, we first counted all turns in terms of successive T-units, varying from 'one turn = (1 T-unit)' to 'one turn = 36 successive T-units' (i.e. the longest turn observed in all data). Since only turns with a length of more than one T-unit are a measure of complexity, turns in the form of a single yes/no-answer or elliptical answer (not counted as a single T-unit) (see Table 10.3) are excluded from the analysis.

Then we calculated the Mean Length of Turns (MLT) and the length of the longest turn (LLT). The MLT and LLT (computed per child and per age group) significantly\(^8\) correlate, because the LLT is included in computing the MLT.

We have seen that the number of turns significantly decreases with age in the PI-children and at the same rate as in the N-children (10.2). Therefore, both N- and PI-children are expected to produce more relatively longer turns with age. With respect to the MLT no group effect was found but an age effect\(^9\) was (Appendix 10, Figure 10a): with age the MLT linearly increases\(^10\) from 1.7 T-units per turn at age four in

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\(^6\) ANCOVA with the number of turns as covariate; group effect F(1,164)=9.19, p<0.003 (nine-year-old PI-children excluded).

\(^7\) Oneway ANOVA: N-children F(4,70)=6.28, p<0.0001, Eta squared .26, R squared .20; PI-children (nine-year-old PI-children included) F(5,114)=6.85, p<0.0001, Eta squared .23 and an R squared .20.

\(^8\) Pearson's chi-square (2-sided)=0.78, p<0.0001.

\(^9\) ANOVA: age effect F(4,165)=7.57, p<0.0001); no significant group effect or age*group interaction effect was observed (nine-year-old PI-children excluded).

\(^10\) One way ANOVA: N-children F(4,70)=4.46, p<0.003; Eta squared .20, R squared .19; PI-children F(4,95)=3.28, p<0.015; Eta squared .12, R squared .11; if we include the nine-year-old PI-children, we even observed an Eta squared .26; R squared .19.
Fortunately abilities both groups to 2.6 in the eight-year-old N-children and to 2.4 T-units per turn in the eight-year-old PI-children. Nine-year-old PI-children even have a MLT of 4 successive T-units. Notwithstanding the linear increase found in both groups, we noted that unexpectedly many relatively short turns (< 3 T-units) are elicited in this genre in both populations. In discourse with familiar adults N-children even as young as four years of age are known to produce long(er) turns (Eisenberg, 1985).

In order to detect PI-children that talk excessively (see 10.5), we explored differences in LLT (Appendix 10; Figure 10b). The mean LLT per age group is approximately 4 to 7 T-units higher than the mean MLT per age group. The differences between the groups are too small to observe a significant group-effect. As expected, the LLT linear increases with age in both N- and PI-children and at the same rate. The LLT increases from approximately 5.1/6.3 to 9.0/9.6 T-units, and even to 12.3 T-units in the nine-year-old PI-children. This sudden fast increase of the LLT between the ages of eight and nine years suggests that at age eight the ability to take longer turns is still in development.

As we know from the literature, the PI-population may contain brief talkers and excessive talkers. This can lead to the MLT not showing any group difference, since extremely low and high MLTs might cancel each other out when computing the total mean per child and per age group. This was in fact the case.

A finer differentiation therefore was needed to detect possible differences between the PI- and N-children. It has been reported frequently that some PI-children, although probably not all, have difficulties in producing long turns (e.g. Audet and Tankersley, 1999; Westby, 1999). It was then decided to investigate the number of Long Turns (3 successive T-units or more). By exploring the production of long turns it is possible that differences will show up, since these long turns require more linguistic effort than shorter turns. Here, we want to know whether the number of Long Turns expressed by PI-children is comparable to the amount expressed by N-children. And, is there comparable development with age?

Since the MLT significantly increases with age in the PI-children, we expect that the older PI-children express more long turns (3 successive T-units or more) than the younger PI-children. The following analysis of the production of long turns will indicate if the groups really are the same.

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11 One-way ANOVA: N-children F(4,70)=4.27, p<0.004, Eta squared .20, R squared .14; PI-children F(4,95)=5.10, p=0.0001, Eta squared .18, R squared .16; if we include the nine-year-old PI-children, we even observed an Eta squared of .21 and an R squared of .20.
10.4.2 Results: Long Turns
In Figure 10.3 we present the percentages Long Turns (≥ 3 successive T-units).

Figure 10.3 The percentages long turns (calculated over all turns) in 75 N-children (Roelofs, 1998) and 120 PI-children

We see that the percentages long turns are comparable in the younger N- and PI-children, but higher in the seven- and eight-year-old N-children than in the same-aged PI-children, resulting in a significant group effect.

10.4.3 Conclusion: Long Turns
The PI-children as a group produce significantly fewer long turns than the N-children, mainly due to the relatively low production of long turns in the seven- and eight-year-old PI-children. This is comparable to earlier reports with respect to English-speaking PI-children (Hobson, 1986; Audet and Tankersley, 1999; Westby, 1999). This analysis, however, still does not allow us to see whether there are individual PI-children with an extremely low MLT and LLT (brief talkers) or whether there are individual PI-children that produce a longest turn (LLT) that is extremely long, but incoherent (excessive talkers). The results of this analysis will be presented in the next section.

12 ANCOVA with the number of turns as covariate; group effect F(1,164)=11.64, p<0.026; no significant age or age*group interaction effect was found (nine-year-old PI-children excluded).
10.5 Brief and Excessive Talkers

10.5.1 Research questions, definitions and operationalisations

To detect brief talkers, we looked at the distribution of the percentages N-children and PI-children who had extremely low scores on the variables MLT and LLT (Length of the Longest Turn).

To detect excessive talkers, we looked at the distribution of the percentages N-children and PI-children who had extremely high score on the variable LLT and produced an incoherent longest turn (LT). The two categories of brief and excessive talkers are mutually exclusive, as brief talkers do not produce an extremely long longest turn, and excessive talkers do not have a low score on the MLT or LLT.

Here, we want to explore whether there are as many brief talkers and excessive talkers in the PI-children as in the N-children.

As mentioned earlier (10.2), a good interview is characterized by relatively short turns produced by the interviewer and relatively long turns produced by the N- and PI-children. When brief talkers produce too many too short turns for their age, they might not be motivated or willing to communicate or they might have problems with the transmission of linguistic information in successive T-units. They might not know what to say next about a conversational topic (e.g. Ninio and Snow, 1996) or they might be frightened to make linguistic mistakes (e.g. Hadley and Rice, 1991). In this case, more effort is needed to get linguistic information from the N- and PI-children who say relatively little in a relatively long time-span. Then, the transmission of information is not efficiently organized.

When excessive talkers keep talking and produce an extremely long and incoherent LT that is often not completely intelligible, they are willing and motivated to communicate. However, they often remain in the speaker role for too long and give the interviewer no opportunity to react on what is said (McTear and Conti-Ramsden, 1992). As a consequence, although the interview takes less time, but the interviewer can only guess what these N- and PI-children are trying to say. Frequently, after such an extremely long and incoherent LT a lot of requests for clarifications are necessary to come to a better understanding (11.1). Both brief and excessive talkers show clear – although distinct – semantic/pragmatic difficulties in efficiently transmitting relevant linguistic information.

N- and PI-children that score below average $z \leq -1$ on both MLT and LLT were diagnosed as brief talkers. This does not mean that they cannot produce longer turns in another communicative situation, but the production of predominantly very short turns shows a clear disability in expressing more utterances in a row in the conversational interview genre. Only if they scored below average $z \leq -1$ on both variables, were they diagnosed as brief talkers. We excluded the N- and PI-children that only stand out on the MLT, since these children might produce at least only once a longest turn with a turn length that is adequate for their age. We also exclude the N- and PI-children that only stand out on the LLT, since these children might produce turns with a turn length that is adequate for their age, except for the longest
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turn. We expect there to be more PI-children than N-children to deviate on both variables.

Next, N- and PI-children that score above average \( z \geq +2 \) on the variables LLT are diagnosed as *excessive talkers*, but only if this extremely long LT is characterized by many incoherently linked contributions. This was judged according to the ability of the N- and PI-children to follow the maxims of Grice (1975) (see 12.2 to 12.8). These incoherently linked successive communicative contributions might contain many morphological/ syntactic errors (see 4.2) that negatively influence the overall impression of coherency.

Although the boundary between a good and excessive talker is debatable, the N- and PI-children that produced coherent, long turns are diagnosed as good talkers, because a long (above average) coherent turn is usually a sign of sophisticated semantic/ pragmatic behaviour. Since good talkers fall mostly between \(+1 > z > +2\), we took \( z \geq +2 \) (and not \( z \geq +1 \)) as the cut-off point to detect the excessive talkers.

To examine whether more PI-children than N-children are diagnosed as brief or excessive talker, two nonparametric tests, Chi-square and Fisher's Exact test were computed. We expected to find more brief and excessive talkers in the PI-children than in the N-children.

10.5.2 Results: Brief and Excessive Talkers

We present the distribution of the percentages N-children and PI-children categorized according to their scores on the variables MLT and LLT. The brief talkers must score below average \( z \leq -1 \) on both variables (Table 10.4).

<table>
<thead>
<tr>
<th>Brief talkers</th>
<th>N-children n=75</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MLT z \leq -1 n</td>
<td>LLT z \leq -1 n</td>
</tr>
<tr>
<td>4 yrs</td>
<td>( \leq 1.39 ) 2</td>
<td>( \leq 3 ) 1 1</td>
</tr>
<tr>
<td>5 yrs</td>
<td>( \leq 1.47 ) 2</td>
<td>( \leq 4 ) 4 1</td>
</tr>
<tr>
<td>6 yrs</td>
<td>( \leq 1.61 ) 2</td>
<td>( \leq 4 ) 6 2</td>
</tr>
<tr>
<td>7 yrs</td>
<td>( \leq 1.72 ) 3</td>
<td>( \leq 4 ) 0 0</td>
</tr>
<tr>
<td>8 yrs</td>
<td>( \leq 1.92 ) 2</td>
<td>( \leq 5 ) 1 1</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-               -</td>
<td>-               -</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>15%</td>
<td>16%</td>
</tr>
</tbody>
</table>
In case of a normally distributed population, we expect that a maximum of 18.3% of all children fall within the marked category $MLT \leq -1$ and $LLT \leq -1$. We see that this holds true for the N-children (MLT: 15%; LLT: 16%). The number of PI-children (MLT: 27%; LLT: 22%) does not fall within the limits of a normal distribution. Especially in the age groups of four-year-old (30%), eight-year-old (25%) and nine-year-old PI-children (40%), many PI-children produce a longest turn that is too short compared to the N-children. In the N-children only 5 (7%) are diagnosed as brief talkers, but in the PI-population there are 18 PI-children (15%). However, this difference proved to be not significant.

Several PI-children were doing extremely poorly: there is one four-year-old PI-child that did not produce any turn longer than 1 T-unit, and one nine-year-old PI-child who produced a longest turn of only 4 T-units, the other turns being even shorter. As mentioned earlier, brief talkers have difficulty in talking about a certain topic in longer stretches of successive T-units in the conversational interview genre. These PI-children often give the impression that they do not want to talk about anything, although it is difficult to judge where the boundary lies between unwillingness (lack of motivation) and disability (see 2.3.1).

The number of N- and PI-children that produce a longest turn that is extremely long in the genre under investigation is presented in Table 10.5.

<table>
<thead>
<tr>
<th>Excessive talkers</th>
<th>N-children n=75</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td>$LLT \geq +2$ n=</td>
<td>$LLT \geq +2$ n=</td>
<td>$LLT \geq +2$ n=</td>
</tr>
<tr>
<td>yrs</td>
<td>T-units</td>
<td>Excessive talkers</td>
</tr>
<tr>
<td>4 yrs</td>
<td>&gt; 8 T-units</td>
<td>2</td>
</tr>
<tr>
<td>5 yrs</td>
<td>&gt; 9 T-units</td>
<td>1</td>
</tr>
<tr>
<td>6 yrs</td>
<td>&gt; 11 T-units</td>
<td>2</td>
</tr>
<tr>
<td>7 yrs</td>
<td>&gt; 12 T-units</td>
<td>3</td>
</tr>
<tr>
<td>8 yrs</td>
<td>&gt; 13 T-units</td>
<td>1</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>12%</td>
<td>2%</td>
<td>16%</td>
</tr>
</tbody>
</table>

Instead of the expected 2.3% in case of a normally distributed population, there are 9 N-children (12%) and 19 PI-children (16%) that produce extremely long stretches of talk. We made a judgement about the coherency of these extremely long LTs. Only

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13 Chi-square (after continuity correction) (nine-year-old PI-children included)
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if N- and PI-children produce an incoherent longest turn based on our analysis of incoherence (see 12.2 to 12.8), were they diagnosed as excessive talkers. In the four-and five-year-olds the longest turns were not incoherent, and therefore judged as semantically/pragmatically adequate. We see that only one seven-year-old N-child (2%) and 12 PI-children (10%) were diagnosed as excessive talkers. These differences proved to be significant. Thus, more PI-children\textsuperscript{14} are diagnosed as excessive talkers than N-children.

The excessive talkers will often tax the interviewer's patience. The flow of information these N- and PI-children give is always partly and sometimes even completely unintelligible. We explored whether the T-units of the longest turns expressed by excessive talkers were incoherently linked (see Chapter 12 and 13), and/or ungrammatical (see 4.2 and 4.3) (Table 10.6).

Table 10.6  The mean percentage ungrammatical T-units and incoherently linked T-units (calculated over all T-units) within the Longest Turn expressed by the 12 excessive talkers from the PI-population

<table>
<thead>
<tr>
<th>Longest Turn Excessive talking PI-children n=12</th>
</tr>
</thead>
<tbody>
<tr>
<td>ungrammatical T-units</td>
</tr>
<tr>
<td>mean range</td>
</tr>
<tr>
<td>mean 27% range 12% - 45%</td>
</tr>
<tr>
<td>incoherently linked T-units</td>
</tr>
<tr>
<td>mean range</td>
</tr>
<tr>
<td>mean 32% range 10% - 51%</td>
</tr>
</tbody>
</table>

Table 10.6 shows that a clustering of morphological/syntactic and semantic/pragmatic problems is often observed in the longest turn expressed by the excessively talking PI-children. This is comparable to an increase of clustering of morphological/syntactic errors in the five longest T-units, measured by MLUL scores (see 8.2). These failures all have a negative influence on the intelligibility of information. It was frequently observed that the PI-interviewer wanted to clarify what the PI-child was saying, but often waited with a request for clarification (see 11.1) in the hope that in what follows the message of the PI-child would make more sense. Thus, as a result of the PI-interviewers' polite, often delayed reaction, these PI-children also might stay in the speaker's role for too long.

It is possible that this type of LI (talking excessively) is characteristic of PI-children with ADHD and PI-children on the autistic spectrum, such as PDD-NOS (Bernard-Opitz, 1992; Rapin, 1996; APA, 2000). However, no clear relationship was found: only 5 PI-children of the 19 PI-children with ADHD and only 2 PI-children of the 25 PI-children with PDD-NOS (together 42%) were diagnosed as excessive talkers. There were also 5 PI-children (58%) falling within the category internalizing PI

\textsuperscript{14} Fisher's Exact test (one-tail): p < 0.014 (nine-year-old PI-children included)
(n=2), Oppositional Behavioural Disorder (n=1), and 'No Diagnosis' (n=3) (see 3.2.1) who were diagnosed as excessively talking PI-children.

10.5.3 Conclusion: Brief and Excessive Talkers

There are more PI-children (n=30; 25%) who fall in the categories brief or excessive talkers than N-children (n=6; 8%). The individual PI-children who belong to the group of brief talkers (15%) have problems with the production of long turns as compared to peers. The individual PI-children (10%) who belong to the group of excessive talkers make extremely long, but incoherent turns that are also marked by an extreme amount of morphological/syntactic failures (see 4.2 and 4.3).

Although more PI-children with ADHD and PDD-NOS were excessively talking than other types of PI-children, contrary to earlier observations (Bernard-Opitz, 1992; Rapin, 1996; DSM-IV-TR, APA, 2000:85-93) this variable does not clearly fit in a specific profile of ADHD or PDD-NOS.

10.6 The ability to take turns smoothly

10.6.1 Research questions, definitions and operationalisations

As stated in the beginning of this chapter, a good interview in Dutch is characterized by smooth turn taking with as few gaps (pauses) and speech overlap between turns as possible. In the course of their development it is supposed that most N-children acquire a fluent, rapid conversational style with a precise timing of turns (McTear, 1985). This development starts quite early in life. From age one on, N-children are already fairly good turn takers with adult interactants; by the time the first words are produced N-children can sustain long bouts of well-timed turn alternations with their mothers (Bateson, 1975). They develop a sensitivity to avoid, for example, speech overlap between turns to prevent a misinterpretation of their message. By age four N-children are able to repair overlapped parts of speech by stopping the ongoing utterance and by repeating the overlapped part (Ervin-Tripp, 1979). Although N-children become good turn takers quite early in life, violations of the turn taking principles are sometimes even made by older N-children, but these are not considered particularly serious by highly co-operative adult conversational partners (Ninio and Snow, 1996).

As already mentioned (see 10.2), some investigators state that LI-children do not appear to have difficulties in turn allocation itself (Fey and Leonard, 1983; McTear and Conti-Ramsden, 1992), but others observe that turn taking failures, such as long gaps and speech overlap between turns, especially interruptions, frequently occur in LI-children with semantic-pragmatic difficulties (Johnson, Johnston and Weinrich, 1984; Rapin, 1987; Adams and Bishop, 1989; Bishop and Adams, 1989; Craig and Evans, 1989, 1993; Van Balkom, 1991).

These turn taking problems are also signalled in PI-children (Fay and Schuler, 1980; Hobson, 1986; Audet and Tankersley, 1999; Westby, 1999). Here, we want to explore whether the PI-children lag behind in the development of smooth turn
taking and show a higher frequency of non-smooth turn alternations than the N-
children (Roelofs, 1998). In a turn exchange the beginning of the turn can be judged
as a smooth or non-smooth. The categories smooth or non-smooth turn starts are
mutually exclusive (see Table 10.7).

Table 10.7 The coding categories of the variable turn exchange (for both interviewer and child)

<table>
<thead>
<tr>
<th>Smooth turn start</th>
<th>No gap</th>
<th>No speech overlap except for a quick uptake by the child</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-smooth turn start</td>
<td>Gap</td>
<td>1-2 sec., 2-3 sec., 3-4 sec. or more than 4 sec. initial overlap or interruption</td>
</tr>
</tbody>
</table>

Problems with smooth turn taking are defined by a significantly high number of
non-smooth turn starts. We expect that the PI-children will start fewer turns
smoothly compared to N-children. The relatively high frequency of morphological/
syntactic errors that were observed (see 4.2) might signal an underdeveloped notion
of sentence boundaries, necessary to decide where a turn of the interviewer ends.
However, we do not expect an age effect in the PI-children, if they are like the N-
children who did not produce significantly more smooth turn exchanges with age
(Roelofs, 1998:81). For the statistical analysis we use ANCOVA's with the number
of turns as covariate in order to reduce the possibility that an increase over time of
the mean total number of smooth turn exchanges is caused by the decrease of the
mean total number of turns with age (see 10.2).

A smooth turn exchange is defined as a start of a turn that immediately follows the
previous turn (1) without a gap longer than one second between the turns and (2)
without speech overlap with the previous turn, except for quick uptakes (Craig and
Evans, 1989; Garvey and Berninger, 1981; Roelofs, 1998).

A quick uptake is a very quick and adequate reaction from the N- and PI-children to
the initiatives of the interviewer (Example 8). In Dutch, this is considered a signal of
good turn taking ability and not as impolite or rude.

Example 8 Quick Uptake (PI-child; age 6;10)

Interviewer: wat zijn dat <vuurstenen> [>]?
(what is that flintstones?)

Ger: →<als> [>] als je nou <dan eh> inne pikkeldonker zo tegen elkaar keihard
<zo he> +"tsjtsjtsj <dan ken je> dan komen er vonkjes.
(<if> [<] if you <then eh> in pitchdark so stone-hard
<so eh> +"tsjtsjtsj, <then you can> then you get sparks)
Non-smooth turn exchanges can be caused by either gaps or speech overlap between turns. We coded a non-smooth turn start as a gap, if the duration of the pause between turns was longer than one second \(^{15}\) (e.g. Jefferson, 1989).

There are four kinds of gaps: (1) gaps between the turn of the interviewer and the turn of the child (Example 9); (2) gaps between the turn of a child and the turn of the interviewer (Example 10). When the interviewer or child leave more than one second between two turns, this is coded as (3) gaps between two turns of the interviewer (Example 11), and (4) gaps between two turns of the child (Example 12). The pause between two turns of the interviewer is coded as a turn chance for the child. Turn chances for the interviewer were not coded following Roelofs (1996; 1998).

Example 9  
(1) gap between the turn of the interviewer and the turn of the child (PI-child; age 6;2)

- **Interviewer:** wat gaan jullie dan doen?  
  (what do you do next?)
- **Carina:**

Example 10  
(2) gaps between the turn of the child and the turn of the interviewer (PI-child; age 7;4)

- **Interviewer:** hebben jullie een hond thuis?  
  (have you got a dog at home?)
- **Rob:** ja  
  (yes)
- **Interviewer:**

Example 11  
(3) gap between two turns of the interviewer (PI-child; age 4;7)

- **Interviewer:** wat gaat Gert dan doen?  
  (what does Gert do then?)
- **Pricilla:** O.  
  (no answer. child yawns)
- **Interviewer:**

---

\(^{15}\) We coded gaps by using a videotape with a time code and a video-recorder with slow-motion facilities. The video was stopped and the time code noted at the moment one speaker stopped talking (or nodding/head shaking) and the time code was noted at the moment (in most cases) the other speaker started talking (or nodding/head shaking). The gap in between was computed: \(\#1\) means a duration between 1-2 seconds, \(\#2\) means a duration between 3 and 4 seconds, etc. Turn internal pauses were transcribed, but not further analysed.
In Example 9, the PI-child responds after a long gap and therefore we scored this as a non-smooth turn start. The PI-interviewer's decision to wait for an answer can also influence gap lengths.

In Example 10, the PI-interviewer gives the PI-child one second to provide more information than is directly asked for. But when the PI-child does not give more information, the PI-interviewer takes a new verbal initiative. This interviewing style is found more often in interviews with the N-children.

In Example 11, the PI-interviewer waits a long time for an answer, but when nothing is said, the PI-interviewer is forced to take a new verbal initiative. Here, PI-children who do not take a turn violate the conditionally relevance rule, that states that each question needs an answer (Schegloff and Sacks, 1973; Mazeland, 1992). These instances are semantically/pragmatically marked and coded as a missing second pairpart (see 11.2 missed turn chances).

In Example 12, the PI-child pauses between turns to give the PI-interviewer a chance to take a turn. It is not unlikely that PI-children who have language difficulties create gaps on purpose in order to avoid speaking. Chance are great that the PI-interviewer will reply after a gap of one second caused by the PI-child in order to avoid long gaps between turns.

It is important to consider how far the conversational behaviour described here may be influenced by variables such as differences in interview style between the N-interviewer and PI-interviewers (e.g. Bishop et al., 2000).

---

16 The N-interviewer start significantly more turns non-smoothly caused by a gap between one and two seconds than the PI-interviewers; ANCOVA with the number of non-smooth turn exchanges caused by a gap as covariate: group effect F(1,163)= 27.60, p<0.0001; no age or age*group interaction effect was found (nine-year-old PI-children excluded).
Differences in interview style

Although we are mainly interested in the N- and PI-children's turn taking performance, we observed that the PI-interviewers start significantly more turns with a gap longer than 4 seconds in comparison to the N-interviewer\(^{17}\). Especially gaps longer than 4 seconds are striking indices of a particular interviewing style. These long gaps may influence the PI-children's linguistic performance positively, giving them an opportunity to respond, while the integration of the content, form and function of a previous turn and the planning of the next turn take some time. We observed that the PI-children will ultimately respond when the PI-interviewer waits long enough. This interview style is seen in general as a good eliciting strategy to interview LI-children (e.g. Heim, 2001).

In the following, we only will present the results with respect to gaps between the turn of the PI-interviewer and the turn of the PI-child (Example 9; type 1) and gaps between two turns of the PI-child (Example 12; type 4). 

Gaps are divided into four categories: (1) 1 - 2 seconds; (2) 2 - 3 seconds; (3) 3 - 4 seconds; (4) more than 4 seconds, in order to identify the very long gaps. Whereas shorter gaps might lead to temporary disturbances in a smooth turn exchange pattern, longer gaps are more semantically/pragmatically marked causing disturbances in the information flow. As was illustrated by Examples 9 and 12, PI-children who start turns non-smoothly caused by longer gaps force the PI-interviewer to be even more patient by waiting for the expected reaction to come. The PI-children thus slow down the speed at which the information is transmitted during the interview.

A non-smooth turn exchange can be caused not only by a gap, but also by speech overlap, further divided into initial overlap or interruption. Initial overlap occurs when interviewer and child both start talking at the same time, also called 'double-starts' (Craig and Evans, 1993), for example after a gap of more than one second (Example 13).

Example 13  

Initial overlap (PI-child; age 7;6); conversational topic: the interviewer asks the name of PI-child's sister\(^{18}\)

Interviewer: hoe heet je zus?  
(what is your sister's name?)

Jan: Bea.

Interviewer: παπα  
#1 <Bea?> [>]  
(1 <and sometimes> [>] I call her Bra)

Jan: →  
#1 <en soms> [-] noem ik haar Beha  
(1 <and sometimes> [-] I call her Bra)

Then, one of the two, mostly the one who caused the overlap, will give away his turn and the current speaker is likely to finish his message (Coulthard, 1985). In

\(^{17}\) ANCOVA with the number of non-smooth turn exchanges caused by a gap as covariate: group effect $F(1,163)=18.44$, $p<0.001$; no age effects are found (nine-year-old PI-children excluded).

\(^{18}\) The information between <-> brackets in combination with [>] and [<] signals speech overlap.
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Example 13, the PI-child is the current speaker who finishes his message (joke about teasing). The 'winner' of the turn also may be the loudest, the most persistent or the one with a higher status (Smith and Leinonen, 1992:76).

An interruption occurs when children start talking, although the interviewer has not finished. Their contribution also is not an adequate reaction to what is said (Example 14).

**Example 14** Interruption by the child (PI-child; age 6.4). Conversational topic: anger caused by parents who do not allow child to play with friends at home

<table>
<thead>
<tr>
<th>Interviewer:</th>
<th>van wie niet?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paraphrasis:</td>
<td>van wie mag je niet thuis spelen met vriendjes? (who does not allow you to play at home with friends?)</td>
</tr>
<tr>
<td>Susan:</td>
<td>#3 van mama. (#3 mama)</td>
</tr>
<tr>
<td></td>
<td>en weet je ook &lt;waarom&gt; [&gt;]? (and do you know &lt;why&gt; [&gt;])</td>
</tr>
<tr>
<td></td>
<td>&lt;niet&gt; [&lt;=] en van papa ook niet. (&lt;not&gt; [=] and papa doesn't either)</td>
</tr>
</tbody>
</table>

In Example 14, the PI-child ignores the question of the interviewer.

We all know from our daily experience with children, that they often are explicitly told in a class-room situation or at the dinner table at home not to interrupt, but to listen and to wait until the speaker has finished his message. In a situation where two or more adults are in conversation, children are also instructed not to interrupt. Parents with young children most of the time react with patience and keep talking to their adult conversational partner(s), while their children try very hard to interrupt by talking loudly (or non-verbally by pulling at clothes, pushing, even by crying). But in a more official setting, such as an interview, even one verbal interruption by the child is judged as impolite.

Moreover, to interrupt is not without risk for the person who does so, as interrupting behaviour can be interpreted as rude, aggressive, self-centred and impolite or just disturbing. The beginning of the interrupter’s message is often not intelligible and is therefore misinterpreted. In the conversational interview genre, interruptions are judged as severe semantic/pragmatic violations, when compared to the more accidentally caused initial overlaps or double-starts.

To explore some qualitative differences between the types of smooth and non-smooth turn exchanges, we analysed the distribution of smooth turn exchanges caused by no gap or a quick uptake on the one hand, and the distribution of non-smooth turn exchanges caused by a gap or by speech overlap on the other. To make quick uptakes the semantic/pragmatic interpretation of the preceding turn must be fully understood. Therefore, we expect to find fewer quick uptakes than smooth turn alternations caused by an absence of a gap in both populations. It is not clear
Turn taking abilities

whether the distribution of both categories for non-smooth turn alternation will differ between the N- and PI-children.

10.6.2 Results: Smooth Turn Exchanges

First we give an overview in Table 10.8 of the results of the analysis of smooth and non-smooth turn exchanges calculated over the mean total number of turns in the N- and PI-children. It is obvious that the PI-children (80%), like the N-children (84%), start most turns smoothly. However, the PI-children start more turns (20%) non-smoothly than the N-children (16%). Comparable to the N-children non-smooth turn taking is more frequently a result of gaps (N-children: 15%; PI-children: 16%) than of speech overlap (N-children: 1%; PI-children: 4%).

Table 10.8 Mean percentage smooth turn starts and non-smooth turn starts (calculated over the total number of turns) in 75 N-children (Roelofs, 1998) and 100 PI-children (4;0 to 8;11 years)\(^\text{19}\)

<table>
<thead>
<tr>
<th>Turn exchanges</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoothly</td>
<td>N=75</td>
<td>N=100</td>
</tr>
<tr>
<td>No gap</td>
<td>82%</td>
<td>78%</td>
</tr>
<tr>
<td>Quick uptake</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Non-smoothly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-2 sec</td>
<td>15%</td>
<td>16%</td>
</tr>
<tr>
<td>2-3 sec</td>
<td>4.8%</td>
<td>4.3%</td>
</tr>
<tr>
<td>3-4 sec</td>
<td>1.2%</td>
<td>1.9%</td>
</tr>
<tr>
<td>&gt;4 sec</td>
<td>0.7%</td>
<td>1.3%</td>
</tr>
<tr>
<td>Speech overlap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial overlap</td>
<td>0.5%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Interruption</td>
<td>0.5%</td>
<td>2.2%</td>
</tr>
</tbody>
</table>

First, as expected, the PI-children, especially the five- and six-year-olds, start significantly fewer turns smoothly\(^\text{20}\) than the N-children. To look at possible age effects, we present in Figure 10.4 the mean percentage smooth turn starts per age group calculated over the number of turns. In the N-children there is a more stable

\(^{19}\) When we present an overview of the general group results of a specific semantic/pragmatic analysis, we do not compare the nine-year-old PI-children with the mean value of the 'nine-year-old N-children' assessed by extrapolation, since we frequently observed relatively great fluctuations of semantic/pragmatic behaviour in the nine-year-old PI-children compared to the eight-year-old N-children and PI-children. Therefore, the results with respect to the nine-year-old PI-children are excluded from this presentation.

\(^{20}\) ANCOVA with the number of turns as covariate: group effect: F(1,164)=4.31, p=0.040; no age effect, but an age*group interaction effect was observed F(4,164)= 4.73, p<0.001 (nine-year-old PI-children excluded). Accordingly, the mean total number of smooth turn exchanges does change across the age levels in both populations in different ways.
developmental pattern of smooth turn starts as opposed to the zigzag pattern in the PI-children. No linear age effects\textsuperscript{21} were found in either populations. Thus, since most turns (N-children: 80%; PI-children: 83%) are already taken smoothly by the four-year-olds, the ability to take turns smoothly further seems to improve very slowly and not significantly in the N-children with age (see also Roelofs, 1998:81-82). This zigzag pattern in the PI-children suggests that there are large individual differences between children in the ability to take turns smoothly.

Second, when we look at types of smooth turn exchanges (Table 10.8), we observe that the PI-children start significantly fewer turns smoothly with no gap between turns (78\%)\textsuperscript{22} than the N-children (82\%). The production of quick uptakes is quite low in both N- and PI-children (2\%) as reported in the literature (Craig and Evans, 1993). In peer-peer interaction, it being a more competitive situation, quick uptakes may be used more frequently. It is therefore not surprising that a very small amount of quick uptakes is found in both N- and PI-children\textsuperscript{23} and that this is stable over time.

Figure 10.4  The percentage smooth turn starts (calculated over all turns) expressed by 75 N-children (Roelofs, 1998) and 120 PI-children

Third, when we look at types of non-smooth turn exchanges, these are caused more often by gaps than by speech overlap in both N- and PI-children. However, the

\textsuperscript{21} One-way ANCOVA (Polynomial contrast) with the number of turns as covariate and age as independent variable (nine-year-old PI-children included).

\textsuperscript{22} ANCOVA with the number of turns as covariate and age as independent variable: group effect $F(1,164)= 4.80, p<0.030$; no age effect, but an age*group interaction effect $F(4,164)=4.20, p< 0.003$ was observed (nine-year-old PI-children excluded).

\textsuperscript{23} ANCOVA with the number of turns as covariate and age as independent variable (nine-year-old PI-children excluded). No group effects are found if we take the number of smooth turns as covariate or use non-parametrical statistics (Chi-square). The outcome that the N-children take more turns smoothly coded as a quick uptake increasingly with age (Roelofs, 1998:82) could not be confirmed using a different statistical method than Roelofs.
amount of non-smooth turn starts caused by a gap is comparable in the PI-children (16%) and N-children (15%). No significant main effects\(^{24}\) are found. It is obvious that the PI-children (7%) start significantly\(^{25}\) more turns non-smoothly caused by speech overlap than the N-children (4%). In the genre under investigation development there is no clear change with age in the number of non-smooth turns as a result of a gap or speech overlap. When we explore possible qualitative differences in the non-smooth turn patterns caused by different gap lengths and caused by different forms of speech overlap, some age effects could appear.

Fourth, when we focus on different types of gap length, we see from Table 10.8 that the N- and PI-children cause non-smooth turn exchanges by gaps between 1-2 seconds roughly more than half of the time and between 2-3 seconds one third of the time. Only few turns are started non-smoothly because of gaps between 3-4 seconds or longer than 4 seconds. Although we did not find any significant main effects\(^{26}\) with respect to gaps between 1-2 seconds, 2-3 seconds and 3-4 seconds, the PI-children start significantly more non-smooth turns caused by a gap longer than 4 seconds\(^ {27}\) than the N-children (Figure 10.5). We see that the seven-year-old PI-children do relatively well when compared to the seven-year-old N-children who are doing relatively badly compared to the other age groups within the N-population.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure10_5.png}
\caption{The percentage gaps of more than 4 seconds (calculated over all non-smooth turn starts caused by a gap) produced by 75 N-children (Roelofs, 1998) and 120 PI-children.}
\end{figure}

\begin{tabular}{|c|c|c|c|c|c|}
\hline
Age  & 4 yrs & 5 yrs & 6 yrs & 7 yrs & 8 yrs & 9 yrs \\
\hline
N-chi: % gaps >4 sec & 6 & 4 & 3 & 8 & 4 & \\
PI-chi: % gaps >4 sec & 12 & 6 & 10 & 7 & 7 & 4 \\
\hline
\end{tabular}

\(^{24}\) ANCOVA with the number of turns as covariate: no significant main effects found (nine-year-old PI-children excluded)

\(^{25}\) ANCOVA with the number of turns as covariate: group effect F(1,164)=12.85, p<0.0001 (nine-year-old PI-children excluded). One-way ANCOVA with the same covariate: no significant linear age effects observed in the N- and PI-children (nine-year-old PI-children included)

\(^{26}\) ANCOVA with the number of non-smooth turn exchanges caused by a gap as covariate (nine-year-old PI-children excluded)

\(^{27}\) ANCOVA with the number of non-smooth turn exchanges caused by a gap as covariate; group effect F(4,163)= 4.59, p<0.034 (nine-year-old PI-children excluded); no age effects are found for gaps longer than 4 seconds.
The PI-children's production of these long gaps might be influenced by the particular interview style of the PI-interviewers, who tend to wait quite long for an answer. Long gaps between turns of both the PI-interviewers and PI-children make these interviews more time consuming than the interviews with the N-children.

Lastly, when we explore the different types of speech overlap (Table 10.8), we see that the PI-children start significantly more turns non-smoothly because of initial overlap28 (twice as many) and interruptions29 (four times as many) than the N-children, whereas the distribution of both categories30 is comparable. The PI-children even seem to interrupt the PI-interviewers more frequently than LI-children in the same situation. For instance, English-speaking LI-children (7;0 tot 10;0 years) make twice as many interruptions as same-aged N-children in conversational interviews with an unfamiliar adult (Craig and Evans, 1993).

10.6.3 Conclusion: Smooth Turn Exchanges
The PI-children start more turns non-smoothly than the N-children, mainly because of extremely long gaps, sentence initial overlap and interruptions. When we look at variation between age groups, it are especially the five and six-year-old PI-children that produce relatively the most non-smooth turn starts. Thus, our findings support earlier reports that have signalled difficulties in smooth turn taking in PI-children (Fay and Schuler, 1980; Hobson, 1986; Audet and Tankersley, 1999; Westby, 1999) and LI-children (Johnson, Johnston and Weinrich, 1984; Rapin, 1987; Adams and Bishop, 1989; Bishop and Adams, 1989; Craig and Evans, 1989, 1993; Van Balkom, 1991). Additionally, the variable 'gaps longer than 4 seconds' may be one of those variables that could be an indicator for semantic/pragmatic impairment (see 3.5).

10.7 General conclusions: the ability to produce long turns and to take turns smoothly
From the analysis of communicative contributions and turns it is clear that no language delay or deficiencies are observed on these basic levels. The P- and N-children show no differences on the MLT or LLT. Both increase similarly with age in both populations. Despite these similarities, the PI-children produce significantly fewer long turns (> 3 T-units) than the N-children. When we look at individual differences within the two populations, we observe that significantly more PI-children than N-children are diagnosed as brief or excessive talkers. Again, these results show that the two populations are not comparable in their ability to produce

28 ANCOVA with the number of turns as covariate; group effect F(1,164)= 4.48, p<0.036; no age or age*group interaction effect is observed (nine-year-old PI-children excluded).
29 ANCOVA with the number of turns as covariate; group effect F(1,164)= 5.05, p< 0.026; no age- or age*group interaction effect is observed (nine-year-old PI-children excluded).
30 ANCOVA with the number of non-smooth turn starts caused by speech overlap as covariate; no main effects found.
long turns. The brief talkers have severe difficulties in producing longer turns, while the excessive talkers have difficulties in producing a coherent longest turn in the conversational interview genre. Morphological/syntactic and semantic/pragmatic errors frequently co-occur in the longest turn of excessive talkers. The LI-symptom ‘talking excessively’ proved to be not exclusively comorbid with ADHD or PDD-NOS. Surprisingly some PI-children with internalizing disorders are also identified as excessive talkers.

The PI-children start significantly more turns non-smoothly than N-children, mainly because of extremely long gaps, sentence initial overlap and interruptions. This may be related to the PI-children's morphological/syntactic deficiencies (see 4.2). Deficiencies in executive function skills that are involved in encoding and decoding sufficiently rapidly for precision-timed turn taking (see 2.3.1) (Craig and Evans, 1989) may also play a part. Clinicians would presumably have judged the PI-children as having no severe turn taking disabilities or none at all, since approximately 80% of all turns were smoothly taken by the PI-children. Deviant semantic/pragmatic turn taking behaviour affects a small part of the exchange, and can only be measured by making a detailed language analysis.

In sum, our findings support earlier reports that signal difficulties in smooth turn taking in PI-children (Fay and Schuler, 1980; Hobson, 1986; Audet and Tankersley, 1999; Westby, 1999). The results are clear indices for the existence of a deviant semantic/pragmatic development in the area of turn taking in some but not all of the PI-children.
11 The ability to repair and to be responsive

Claudia Blankenstijn

11.1 Introduction

Turn taking is central to conversation and is dependent on the responsiveness of the conversational partners. The ability to repair is necessary for turn taking to continue smoothly. Some repair strategies directly concern turn taking, while others are more focussed on repairing communicative breakdowns with respect to the accessibility and intelligibility of information, conveyed in morphological/syntactic form and structure. Other repair strategies are more involved in creating clarity about semantic/pragmatic content and intention of messages (e.g. Ninio and Snow, 1996). The acquisition of repair strategies, a semantic/pragmatic ability that starts at age two/three, is essential for children to learn, but it might be delayed in LI- and PI-children.

Deficiencies on the turn exchange level, such as long gaps and interruptions between turns, have a negative influence on the transmission of information (see 10.6), but they have relatively little impact on the quality of the interview compared to the impact of N- and PI-children's responsivity. The amount of extended discourse is a marker of responsivity, whereas missed turn chances and minimal answers are markers of non-responsivity.

In order to explore the ability to repair and be responsive, and to detect possible difficulties, we carried out a functional language analysis on the basis of Speech Act theory (Austin, 1962; Searle, 1969) following the model of Roelofs (1996; 1998) (Table 11.1).

<table>
<thead>
<tr>
<th>Speech act functions</th>
<th>Interviewer</th>
<th>Speech act functions</th>
<th>Child</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linguistic stimulating effort</td>
<td>- feedback, prerequests, assertions, acknowledgement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First pairparts</td>
<td>- request for information, clarification, acknowledgement and for action</td>
<td>Second pairparts</td>
<td>- answer, clarification, acknowledgement and response</td>
</tr>
<tr>
<td></td>
<td>- assertion</td>
<td>Extended discourse</td>
<td>- assertive or narrative contributions, repair</td>
</tr>
<tr>
<td>Second pairparts</td>
<td></td>
<td>First pairparts</td>
<td>- request information, clarification and attention</td>
</tr>
</tbody>
</table>
In general, we therefore have to know whether the PI-children produce a comparable amount of certain speech act functions as the N-children. And, is there comparable development with age?

In all conversational interviews, we first identified all adjacency pairs. These consist of two communicative contributions, coded as first pairpart (initiative of the interviewer) and second pairpart (reaction of the child) categorized according to their function and form (see also Ninio, Snow, Pan and Rollins, 1994). In this genre the different types of speech act functions within adjacency pairs are rather limited, being most frequently of the 'question - answer' type and falling within the broad repertoire of different speech act functions already acquired by four-year-old N-children. We then identified those successive communicative contributions that could be coded as extended discourse that is when children tell more than is strictly asked for. One type of extended discourse is, for instance, an anecdote about an everyday-life event, narrated in successive communicative contributions within a long turn (see 10.3 and 10.4). In this type of conversational genre, the interviewer can mostly ask short questions or give short comments while the conversational narrative is told. These conversational narratives are like everyday narratives that are in most cultures an even more interactive linguistic genre, since more narrators can tell the same story (e.g. Gullich and Quasthoff, 1986). The themes of four- to five-year-old English-speaking N-children frequently are concentrated on animals and their activities, whereas six- and seven-year-olds prefer danger and adventure stories. With increasing age, it is observed that English-speaking N-children (3;0 to 7;11 years) realize that conversational narratives need to be reportable (interesting, strange, unusual) to justify the extended talking turn that story telling allows the speaker (Haslett, 1986). We then selected the repairs and children's first pairparts requests for clarification in order to explore their ability to repair conversational breakdowns.

Differences in interview style
It is important first to consider how far the conversational behaviours described here may be influenced by variables such as differences in interview style between the N-interviewer and PI-interviewers (e.g. Bishop et al., 2000) (see also 10.5.1).

Both N-interviewer and PI-interviewers needed to produce significantly fewer initiatives to bring the interview to an end (50 T-units) in interviews with older N-children and PI-children (see also Roelofs, 1998:88). However, there also proved to be clear differences in interview style, since the PI-interviewers had to be more actively involved than the N-interviewer. First, the PI-interviewers not only gave significantly more feedback, but also expressed more prerequests than the N-interviewer (Table 11.1). For instance, these are general requests for information

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1 We prefer the term function instead of 'speech acts', because we do not restrict the different function categories to the most well-known function-pairs in case of the function assertion and narration.

2 ANOVA: no group effect; age effect F(4,165)= 9.77, p=0.0001 (nine-year-old PI-children excluded); One way ANOVA: N-interviewer: F(4,70)= 5.76, p<0.0001; Eta squared .25; R squared .19; PI-interviewers: F(5,114)= 7.01, p<0.0001; Eta squared .24; R squared .20 (nine-year-old PI-children included).

3 ANOVA: the percentage feedback calculated over the number of communicative contributions: F(1,165)=5.54, p<0.02 (nine-year-old PI-children excluded).
frequently used to introduce a new conversational topic (Mazeland, 1992; Roelofs, 1996, 1998). In general, prerequests give children time to activate a certain semantic field in order to be more prepared to answer the specific first pairpart-requests that follow.

Second, the PI-interviewers expressed significantly more assertions (declaratives) and acknowledgements, including tag-questions 'leuk, he?' (nice, isn't it?) and declaratives with a question-intonation, than the N-interviewer. Both have the function of closing previous conversational topics and indicate interest on the part of the interviewer and require little response from the children (Bishop, Chan, Hartley and Weir, 1998).

The N-interviewer expressed significantly more requests for acknowledgement (single 'yes?' or a 'no?' with rising intonation) than the PI-interviewers. In Dutch such requests mostly function as a prompt for further new information. The PI-interviewers had to spend significantly more time and effort asking for a clarification of old information. This phenomenon has been signalled earlier by Adams and Bishop (1989) in interviews with English-speaking school-aged LI-children and with preschool Dutch-speaking (S)LI-children (Van Balkom, 1991). Most requests for clarification concern the content rather than the form, and get a response from the PI-children. This is similar to results found in (S)LI-children (McTear and Conti-Ramsden, 1992; Bishop et al., 2000), although it is known that the ability to adjust and revize prior messages might be restricted (McTear, 1985). Finally, the PI-interviewers also had to spend more time and effort to keep the PI-children task-oriented and expressed significantly more requests for action/attention (e.g. 'please, sit on your chair!).

The PI-interviewers tried to create smooth interaction by structuring the information and by giving positive feedback (e.g. Smith and Leinonen, 1992:132). We have a strong impression that the PI-interviewer's efforts had a positive influence on the responsivity of the PI-children. Without this effort the interview might never have been completed in certain cases. Some PI-children gave the impression to be rather unmotivated to share information with an unfamiliar adult about everyday-life events (see 2.3.1) probably related to their limited mastery of morphological/syntactic form (Miller, 1991) (see 4.2) or the awareness of the morphological/syntactic inability to communicate effectively (Hadley and Rice, 1991). In the following, we will explore whether the PI-children are as responsive as the N-children. And, is there comparable development with age?

It is possible that these differences in the PI-interviewers' interview style supported the PI-children to such an extent that they will show no differences in responsivity.

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4 ANCOVA with the number of episodes as covariate; Prerequests: F(4,164)=14.62, p<0.001; Assertions: F(4,164)=2.99, p<0.021; Acknowledgements: no significant group effect (nine-year-old PI-children excluded).

5 ANCOVA with the number of first pairparts as covariate; group effect F(1,164)=169.43, p<0.0001 (nine-year-old PI-children excluded).

6 ANCOVA with the number of first pairparts as covariate; group effect F(1,164)=63.66, p<0.0001 (nine-year-old PI-children excluded).

7 ANCOVA with the number of first pairparts as covariate; group effect F(1,164)=63.66, p<0.0001 (nine-year-old PI-children excluded).
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If they still show differences, then it will be in spite of the PI-interviewers' greater support.

First, we will examine areas of language difficulty with respect to responsiveness, by considering the amount of missed turn chances (11.2) and minimal responses (11.3). Then we will consider areas of responsiveness in terms of second pairpart functions (11.4) and extended discourse with a narrative character (11.5). Next, we will present the results with respect to the ability to repair conversational breakdowns, measured by the amount of repairs (11.6) and requests for clarification (11.7), ending with the overall conclusion about the PI-children's responsivity (11.8).

11.2 Missed Turn Chances

11.2.1 Research questions, definitions and operationalisations
Each first pairpart expressed by the interviewer is a chance for children to take a turn and to express a second pairpart. This second pairpart is conditionally relevant as it is pragmatically expected (Schegloff and Sacks, 1973; Mazeland, 1992; see 10.5.1). When children do not react with a second pairpart, this semantically/pragmatically marked behaviour is coded as missed turn chances. These are divided into missing second pairpart where the child does not respond (Example 1) and second pairpart breaks that are almost absent second pairparts (Example 2).

Example 1  
Missing second pairpart (PI-child; age 7;7); conversational topic: buying a pet in the near future

Sander: we kopen er wel een.  
(Interviewer: wat gaan jullie kopen? (what will you buy?)
Sander: 0  
(Interviewer: #2 vertel der eens over. (Example 2)  
(what will you buy?)
Sander: →
(Interviewer: #2 vertel der eens over. (Example 2)
(what will you buy?)

In Example 1, the PI-interviewer waits and gives the PI-child a chance to respond, but when no reaction comes, this is coded as a missing second pairpart (see 10.5). Then, the PI-interviewer has to take a new verbal initiative. We use this information to detect PI-children's semantic/pragmatic difficulties in responsivity. Bishop, Chan, Adams, Hartley and Weir (1998) found that English-speaking pragmatic LI-children were more likely to give no response at all than to give a non-verbal response, as opposed to same-aged N-children that prefer a non-verbal response, when they cannot give a (more elaborate) verbal response (Example 1).

8 'No turn' is transcribed as '0'; see for transcription symbols Appendix 4a.
9 Completely unintelligible communicative contributions were excluded from the analysis from the beginning (see 10.2).
10 The STAP (Van den Dungen and Verbeek, 1994) requires that the interview is repeated when children miss many turn chances.
The ability to repair and be responsive

A nearly totally absent second pairpart is further referred to as a (*second pairpart*) break and scored when a question or other initiative of the interviewer is for the most part unanswered (Example 2).

**Example 2**  
*Second pairpart break (PI-child; age 9:9)*

| Interviewer: | nou, wat dan? | First pairpart
|-------------|--------------|
| Kevin:→     | #5 eh +..... | Second pairpart Break
|             | (#5 eh +.....) |
| Interviewer: | #1 weet je niks te verzinnen even? | #1 don't you know what to say for the moment?
| Kevin: | nee. | (no)

In Example 2, the PI-child starts a reaction, but no complete message is expressed. The difference between a second pairpart break and a missing second pairpart is that a break frequently functions as a claim to take a turn, giving the speaker more time to work out the content. Namely, when a conditionally relevant second pairpart has been started, the expectation is that it will be finished. The listener will wait for completion, which usually follows.

We made a comparative analysis of the number of missed turn chances (missing second pairparts + second pairpart breaks) in order to gain insight into the N- and PI-children’s responsivity. Problems with responsivity are defined as a significantly high number of missed turn chances. Here, we will explore whether the PI-children have as many missed turn chances as the N-children. And, is there comparable development with age? We expect that younger children (N and PI-children) and PI-children leave more initiatives of the interviewer unanswered and that older N- and PI-children are more responsive than younger ones.

### 11.2.2 Results: Missed Turn Chances

From Table 11.2 we see that only a very small percentage of the first pairparts expressed by the interviewer is not (or only partly) answered by the N- and PI-children in this type of conversation. The N-children appear to answer the questions of the N-interviewer less frequently than the PI-children, but these differences proved not to be significant. This result is in line with the results described in section 10.5: as the PI-interviewers waited significantly longer than the N-interviewer for an answer to come (see 10.6), the chance to miss a turn is minimalized for the PI-children.

We observed a significant linear decrease of missed turn chances in the PI-children comparable to the N-children, only when we excluded the nine-year-old PI-children.

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11 ANOVA: no group or age*group interaction effect was observed; age effect: $F(4,165)=5.56, p<0.0001$ (nine-year-old PI-children excluded).

12 Oneway ANOVA: $F(5,114)=5.05, p<0.0001$; Eta-squared 0.18; R squared 0.11 (nine-year-old PI-children included)
(Roelofs, 1998:90) (Appendix 11; Figure 11a). We expect that with age the PI-children respond more frequently with a second pairpart or extended turns, although these reactions might still be minimal, inappropriate, and so on.

Table 11.2 The percentage missed turn chances (calculated over the number of first pairparts expressed by the interviewer) in interviews with 75 N-children (Roelofs, 1998) and 100 PI-children in the age of 4 to 8 years

<table>
<thead>
<tr>
<th>Missed turn chances</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=75</td>
<td>n=100</td>
<td></td>
</tr>
<tr>
<td>Missed turn chances</td>
<td>3.6%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Missing second pairpart</td>
<td>3.2%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Second pairpart break</td>
<td>0.4%</td>
<td>0.8%</td>
</tr>
</tbody>
</table>

However, we noticed a considerable individual variation in the number of missed turn chances. If we excluded the outliers in both N- and PI-population (see Wilcox, 2002)\(^\text{13}\), we observed that from age six on most N- and PI-children follow the conditional relevance rule (Schegloff and Sacks, 1973; Mazeland, 1992; see 10.5.1).

After a more detailed inspection of the data, we also observed that in interviews with N-children mostly initial speech overlap (see 10.6) caused a break. This phenomenon can be interpreted as a normal pragmatic politeness strategy (McTear and Conti-Ramsden, 1992). The majority of the breaks in interviews with the PI-children was caused by the fact that they started a turn, but suddenly did not know what to say next.

Missing second pairparts (no answers) were most frequently elicited by a request for acknowledgement in the interviews with the N-children. Conversely, these missing second pairparts were most frequently elicited by a request for information in interviews with the PI-children, although also by a request for acknowledgement (e.g. indirect requests for more specific information). Missing second pairparts thus were not elicited in the PI-children with requests for clarification. This means that the PI-children mostly can fulfil the semantic/pragmatic demands of clarification requests in spite of linguistic deficiencies, similarly to the findings from earlier studies that show that LI-children recognize that requests for clarification require a response (e.g. Porter and Conti-Ramsden, 1987). However, the answers to requests for clarifications can still be not explicit enough, for instance, when coded as minimal responses (see 11.3.2).

\(^{13}\) If a normal distribution exists, but outliers tend to appear (conventionally outliers have scores more than two standard deviations from the mean), any method based on means can have poor power (Wilcox, 2002:400). When outliers are excluded, more common patterns can be observed.
11.2.3 Conclusion: Missed Turn Chances

As opposed to the English-speaking LI-children with pragmatic disorders who frequently gave no responses to questions in conversation (e.g. Bishop et al., 2000), the PI-children unexpectedly did not leave more initiatives of the interviewer unanswered compared to the N-children. This probably was caused by the PI-interviewers' patience, since they waited a relatively long time for an answer to come. As expected, the decrease in missed turn chances over time signals that both N- and PI-children become more responsive with age.

11.3 Minimal Responses

11.3.1 Definitions, research questions and operationalisations

When children follow the semantic/pragmatic rule of conditional relevance, they give second pairpart responses. But second pairparts expressed by the child can be categorized as informative (enough information) or as minimal response (not enough information) (Roelofs, 1998:85-86). Minimal responses do not contain enough relevant information to questions that actually prompt for content information (Peterson and McCabe, 1983), such as the first question about a new conversational topic. These minimal responses are different from responses to non-information-soliciting first pairparts expressed by the interviewer, such as tag-questions or declaratives with a question intonation. Then 'yes' or 'no' are expected as an answer and are semantically/pragmatically correct (e.g. Bishop et al., 2000). Minimal responses can have the form of verbal yes/no answers, non-verbal equivalents (nodding/shaking the head), elliptical answers (don't know) or non-elliptical answers (that I don't know) in the form of one T-unit, on which no communicative contributions in the same turn follow. Minimal responses provide no new information other than confirmation, denial or statement of ignorance (Adams and Bishop, 1989).

In the course of their development, we expect that N-children learn to respond to all kinds of initiatives from the interviewer, independently of the functions and/or forms of these initiatives. However, to answer appropriately can be relatively more difficult in the case of indirect speech acts, where function and form are not explicitly related to one another (Searle, 1969; Sperber and Wilson, 1986). The fact that many indirect requests for acknowledgement remained unanswered in both populations confirms this idea (see 11.2). Similarly to the analysis of missed turn chances, we therefore will check whether minimal responses are elicited more frequently by indirect than direct speech act functions. Both indirect first pairparts (Example 3 and 4) and direct, open first pairparts (Examples 5 and 6) may elicit minimal responses.

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Chapter 11  Semantic/Pragmatic conversational development

Example 3  Minimal response to a request for acknowledgement (PI-child; age 7;7)

Interviewer: hebben jullie thuis ook huisdieren?
(do you have pets at home too?)
Sigrid: nee
(no).
Interviewer: nee?
(no?)
Sigrid: nee.
(no)

Paraphrasis: waarom niet?
(why not?)

Example 4  Minimal response to a request for acknowledgement (PI-child; age 4;4)

Interviewer: heb je ook vriendjes?
(do you have friends too?)
Robin: ja.
(yes).
Interviewer: ja?
(yes?)
Robin: ja.
(yes).

Paraphrasis: wie zijn je vrienden?
(who are your friends?)

In Examples 3 and 4, the PI-interviewers' intention was to get more new and specific information (see paraphrases). PI-children might wrongly interpret requests for acknowledgement, because (1) they stick to the literal interpretation, as if the previous question was asked again, or (2) they assume that the interviewer is questioning the sincerity condition of the answer given and wants to know if the PI-child has told the truth (e.g. Searle, 1969). The content, function and form of a request for acknowledgement is the most implicit compared to other speech acts, and the right pragmatic interpretation is highly dependent on children's ability to take into account the interviewer's interest in new, detailed information about the ongoing conversational topic. However, Example 5 and 6 illustrate that PI-children can give minimal responses to rather simple, open and direct questions.

Example 5  Minimal response to a request for information (PI-child; age 5;3)

Interviewer: speel je weleens met Chantal?
(do you play sometimes with Chantal?)
Richard: ja.
(yes).
Interviewer: wat doen jullie dan?
(what do you do/play?)
Richard: dat weet ik niet
(I don't know)

Similarly, PI-children might wrongly interpret requests for information for different reasons. Firstly, they might not comprehend the question-word (such as what, how, why, and so on) or they might be confused by the possibility of more than one right interpretation of the question asked. Then, they seem to be unable to resolve this confusion with either a request for clarification (e.g. do you mean 'what do you play
The ability to repair and be responsive

most of the time?) or by picking out just one possible interpretation, probably because they are afraid of giving a wrong answer.

Secondly, when no answer comes to mind, PI-children seem to have problems with the social-cognitive abilities involved in creatively composing a suitable answer. In Example 5, for instance, the PI-child has to reactivate a representation of a playing scene in order to give a description. In order to talk about scenes, mental representations of situations or events have to be reactivated, being part of a Theory-of-Mind (Perner, 1991; Wellman, 1992; see 2.3.3). PI-children may have problems with developing the ability to reactivate mental representations of scenes or cannot put them into words.

Thirdly, as mentioned before, PI-children may avoid giving a more elaborate answer, probably related to their limited mastery of morphological/syntactic form (Miller, 1991) (see 4.2) or the awareness of the morphosyntactic inability to communicate effectively (Hadley and Rice, 1991).

Fourthly, when PI-children are put slightly under pressure to show extravert language behaviour, it is plausible that the PI-children, especially those with Anxiety disorder, produce relatively many minimal answers because of more general feelings of uncertainty. Finally, N- and PI-children may give minimal responses when they do not want to talk about certain conversational topics (Example 6).

Example 6 Minimal response to a request for information (PI-child; age: 9.5)

Interviewer: en hebben jullie weleens ruzie?
Sebastiaan: ja.
Interviewer: waarover?
Paraphrasis: waarover heb je weleens ruzie met je zus?
Sebastiaan: o weet ik niet.
Interviewer: nou hijna niet nee.
Sebastiaan: nee?
Interviewer: (now nearly not, no)
Sebastiaan: nee.

Example 6 shows that family affairs can be a conversational taboo, since school-aged children are known to be very loyal to their family. A few nine-year-old PI-children gave the impression that even their every day life experiences were private and thus not a topic to talk about.

Minimal responses can be caused not only by linguistic difficulties, but also by lack of creativity and motivation. Although we are aware of such differences, we can not be sure in each single case what has caused the minimal response. This is a matter of interpretation. Taking into account, however, that indirect requests elicit more minimal responses than direct requests, especially in the PI-children, we want to explore this supposed dependency.
We made a comparative analysis of the number of minimal responses in order to gain insight into the N- and PI-children's responsivity. Problems with responsivity are defined as a significantly higher number of minimal responses. Here, we will explore whether the PI-children produce as many minimal responses as the N-children. And, is there comparable development with age? We might expect that younger N- and PI-children and PI-children produce more minimal answers and that older N- and PI-children and N-children are more responsive.

11.3.2 Results: Minimal Responses
From Table 11.3, we see that at rough computation at least 10% to 11% of all communicative contributions expressed by the N- and PI-children respectively, are judged as minimal responses. Although difficult to compare, these rates seem relatively high when compared to the rates reported in pragmatic LI-children (Bishop et al., 2000).

### Table 11.3
The percentage minimal responses (calculated over the number of second pairparts in the form of a non-verbal or verbal yes/no answer, ellipsis and T-unit answer) expressed by 75 N-children (Roelofs, 1998) and 100 PI-children (4;0 to 8;11 years)

<table>
<thead>
<tr>
<th>Minimal responses</th>
<th>N-children n=75</th>
<th>PI-children n=100</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>minimal response</td>
<td>non-minimal response</td>
</tr>
<tr>
<td>Non-verbal yes/no answer</td>
<td>23%</td>
<td>77%</td>
</tr>
<tr>
<td>Verbal yes/no answer</td>
<td>11%</td>
<td>89%</td>
</tr>
<tr>
<td>Clausal ellipsis</td>
<td>1%</td>
<td>99%</td>
</tr>
<tr>
<td>T-unit</td>
<td>10%</td>
<td>90%</td>
</tr>
</tbody>
</table>

In both N- and PI-children an equal amount of minimal responses in the form of elliptical answers and T-units were elicited: no significant group effect was found. However, when taking these two measures together, the PI-children (14%) express significantly more minimal responses than the N-children (11%).

Next, we see that the PI-children give twice as many minimal non-verbal and verbal yes/no responses than the N-children (Roelofs, 1998). In this way they

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15 ANCOVA with the total number of elliptical responses as covariate (nine-year-old PI-children excluded).
16 ANCOVA with the total number of T-unit responses as covariate (nine-year-old PI-children excluded).
17 ANCOVA with the total number of (non)elliptical responses as covariate; group effect $F(1,163)=7.43$, $p<0.007$ (nine-year-old PI-children excluded).
18 ANCOVA with the total number of non-verbal yes/no responses as covariate; group effect $F(1,163)=13.57$, $p<0.0001$ (nine-year-old PI-children excluded); no linear age effects were observed in both populations.
resemble younger N-children and same-aged (S)LI-children (Rosinski-McClendon and Newhoff, 1987; Adams and Bishop, 1989). Remarkably, even in the oldest PI-children a relatively high frequency of minimal non-verbal yes/no-responses is found. This behaviour resembles that of younger N-children (Bishop, 1997), but shows that the PI-children are quite unlike pragmatic LI-children. Recent research reports that pragmatic LI-children tend to prefer to give 'no answer' rather than to give minimal answers, they seeming to be unaware of semantic/pragmatic conversational demands (Bishop et al., 2000). The PI-children prefer to give minimal responses rather than no responses (see 11.2).

When we investigated the possible influence of the (in)directness of the interviewer's initiatives on the non-responsiveness of the N- and PI-children (Appendix 11: Table 11a), we observed that minimal responses are significantly more frequently elicited in the PI-children than in the N-children by requests for information and clarification, followed by requests for acknowledgements. In this respect, the PI-children are quite unlike N-children. Minimal responses were most frequently elicited in N-children (as young as four years) by other speech act functions than requests for information or clarification (Bishop et al., 2000). As opposed to younger N-children, the PI-children respond most frequently with minimal answers to information-soliciting requests.

Next, in order to explore the possible influence of the (in)directness of the interviewer's initiatives in even more detail, we divided requests for information and clarification into relatively more direct/open questions, such as wh-questions or alternative questions as opposed to relatively more indirect/closed questions, such as yes/no questions and tag-questions. Requests for information and clarification in the imperative or declarative form are judged to be the most indirect speech act function/form mappings.

In Table 11.4 we present the total percentage of non-minimal responses to a first pairparts with the function request for information and clarification expressed by the N- and PI-interviewers. We see that in the conversational interview genre many minimal responses expressed by the N-children are elicited by the N-interviewer with a request for information (33%) calculated over all requests for information and with a request for clarification (11%) calculated over all requests for clarification. Even more minimal responses expressed by the PI-children are elicited by the PI-interviewers with a request for information (48%) and with a request for clarification (34%). We also present the percentages minimal responses expressed by the N- and PI-children elicited by forms that differ in directness. The PI-children proved to give significantly more minimal responses to a request for information and clarification in the form of a yes/no-question (relatively more indirect/closed) and in the

19 ANCOVA with the total number of verbal yes/no responses as covariate; group effect F(1,163)= 18.59, p<0.0001 (nine-year-old PI-children excluded): no linear age effects were observed in both populations.
20 These results do not correspond with Roelofs (1998:113), because we included minimal responses in the form of (non)elliptical contributions.
21 ANCOVA with the number of requests for information in the form of a yes/no-question as covariate. group effect F(1,164)= 52.47, p<0.0001 (nine-year-old PI-children excluded).
declarative form (relatively most indirect) than the N-children. These findings are comparable to earlier similar results that signalled LI-children’s difficulties in answering sufficiently to indirect requests (Shatz, Bernstein and Shulman, 1980).

Table 11.4 The percentage minimal responses expressed by 75 N-children and 100 PI-children (4:0 to 8:11 years) as reaction to the N- and PI-interviewer’s requests for information/clarification in the interrogative, imperative and declarative form

<table>
<thead>
<tr>
<th>Minimal Responses</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=75</td>
<td>n=100</td>
</tr>
<tr>
<td>Total % non-minimal and minimal responses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% non-minimal responses</td>
<td>67%</td>
<td>89%</td>
</tr>
<tr>
<td>% minimal responses</td>
<td>33%</td>
<td>11%</td>
</tr>
<tr>
<td>Interrogative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>wh-question</td>
<td>21%</td>
<td>9%</td>
</tr>
<tr>
<td>alt-question</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>tag-question</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>yes/no-question</td>
<td>3%</td>
<td>0%</td>
</tr>
<tr>
<td>Imperative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Declarative</td>
<td>4%</td>
<td>0%</td>
</tr>
<tr>
<td>Declarative</td>
<td>8%</td>
<td>2%</td>
</tr>
</tbody>
</table>

With respect to requests for information and clarifications in the forms of a wh-question or tag-question (relatively most direct/open) no main effects were observed, except that the PI-children also gave significantly more minimal responses to a request for information in the form of an alternative question (relatively more direct/open) than the N-children. Importantly, these results signal a clear semantic/pragmatic language delay in the PI-children, since they seem unable to respond appropriately to indirect speech acts that are characterized by the absence of a one-to-one form/function mapping. The PI-children must therefore have severe difficulties in interpreting pragmatic intentions of such indirect speech acts. Similar language difficulties have been reported to exist:

ANCOVA with the number of requests for clarification in the form of a yes/no question as covariate; group effect: F(1,164)=27.66, p<0.001: interaction effect F(4,164)=5.60, p<0.0001 (nine-year-old PI-children excluded).

ANCOVA with the number of requests for information in the form of a declarative as covariate; group effect F(1,164)=10.01, p<0.002; age effect F(4,164) = 5.45, p < 0.0001 (nine-year-old PI-children excluded). ANCOVA with the number of requests for clarification in the form of a declarative as covariate; group effect F(1,164)= 9.14, p< 0.003; no age or interaction effect found (nine-year-old PI-children excluded).

ANCOVA with respectively the number of requests for information in the form of a wh-question, alternative question, tag question and imperative form as covariate (nine-year-old PI-children excluded). No main effects are found, because the mean numbers within these categories are too small. Using ANOVA over percentages we observed that the PI-children produced more minimal responses as reaction to alternative questions than the N-children: F(1,165)= 6.32, p<0.013.
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in English-speaking five- and six-year-old LI-children (Shatz, Bernstein and Shulman, 1980) and especially in LI-children with semantic-pragmatic disorder (Bishop and Rosenblom, 1987). The PI-children also seem to miss the semantic/pragmatic meta-linguistic insight or overview that all initiatives of the interviewer are intended to make them talk.

11.3.3 Conclusion: Minimal Responses

The N-children proved to be able to react communicatively to many first pairparts of the N-interviewer, independent of their function and/or form. The PI-children on the other hand gave significantly more minimal responses than the N-children, especially to indirect requests for information and clarification in the closed-question interrogative or declarative form.

As mentioned before (see 11.2) this high amount of minimal responses in the PI-children may be related in general to receptive language difficulties and/or expressive language difficulties, and to a lack of creativity and motivation, such as the fear to make mistakes or the unwillingness to talk.

11.4 Functions of Second Pairparts

11.4.1 Research questions, definitions and operationalisations

As shown in Table 11.1, an adequate response can be a second pairpart. Second pairparts contain the function of answer, clarification, acknowledgement or response. When the second pairpart is the first contribution of a long turn, it is part of extended discourse that can have either an assertive or a narrative function.

From the developmental literature we know that from age two to three on, N-children acquire many different speech act function/form types, such as imperatives to direct behaviour of others ('look! look!') or expressive acts to inform others about their feelings ('bah! bah!'). Before age four/five, N-children have learned different morphological/syntactic structures that can have varying functions in the discourse (e.g. Ninio and Snow, 1996) From age six on, school-aged children learn to use new speech act functions typical for school settings, and they will learn to express successive speech acts in extended discourse. Together these speech acts – for instance assertions in an argumentation – mostly function to attain one higher communicative goal to get things done (Baker, Blankenstijn and Roelofs, 1999, 2000).

In LI-children as well as in PI-children there may be limitations with respect to the use of speech act functions (Ninio, Snow, Pan and Rollins, 1994). Firstly, their range of speech acts can be limited. For instance, some LI-children prove to be poor in repairing conversational breakdowns with a 'request for clarification' or a 'repair' (e.g. Donahue and Bryan, 1985) and in giving responses to indirect requests (Shatz, Bernstein and Shulman, 1980). Such limited speech act ranges are also found in PI-children with internalizing disorders (Schecterman, Wollner and Geller, 1978), in PI-children on the autistic spectrum (Prizant and Rydell, 1984) and in schizophrenic and autistic PI-children (e.g. Cunningham, 1968). In some PI-children informative
responses to questions are found missing sometimes (Ninio, Snow, Pan and Rollins, 1994) (see 11.2; 11.7). Conversely, normal conversational responsivity was observed in a group of Dutch-speaking LI-children (Willemsen-Swinkels, Buitelaar and Van Engeland, 1997). Limitation can also be caused by the overuse of certain communicative functions. For instance, some PI-children on the autistic spectrum show a stereo-type, routine-like overuse of requests for information that solely function as initiations and maintenances of social contact rather than for obtaining information (Hurtig, Ensrud and Tomblin, 1982). The range of forms to express certain speech acts might also be rather limited, when, for example, only gestural 'intentions' are expressed instead of overt verbal requests, such as has been seen in PI-children on the autistic spectrum (Wetherby and Prutting, 1984). Limitations with respect to the use of speech acts might also be found in a limited effective use of speech act functions. This has been frequently noticed in PI-children and LI-children with semantic-pragmatic impairment (e.g. Gallager and Prutting, 1983; Rapin and Allen, 1983, 1987).

It is important to bear in mind that the distribution of first pairpart functions expressed by the N- and PI-interviewers (see 11.1) mirrors the second pairparts functions expressed by the N- and PI-children, respectively. In the conversational interview genre these functions are almost restricted to the following functionally contingent pairs: request for information-answer; request for clarification-clarification; request for acknowledgement-acknowledgement; request for action-response or request for attention-response (Table 11.1).

From Roelofs (1998:106) we know that in the N-children these four second pairpart functions decrease with age in favour of extended discourse with an assertive or narrative character. In the conversational narratives the N-children gave more information than was directly asked for, reflecting complex and sophisticated language skills and responsiveness to indirect requests. Thus, we expect to find a linear decrease with age of the second pairpart functions (answer, clarification, acknowledgement and response) in the PI-children, comparable to the N-children, although the PI-children might show a delayed (or deviant) development (Ninio, Snow, Pan and Rollins, 1994).

Based on what we know about the differences between the N-interviewer and PI-interviewers' eliciting behaviour (see 11.1), we expect that the PI-children react more frequently with a clarification than with an answer compared to the N-children. Additionally, we expect that the PI-children produce fewer acknowledgements, since the PI-interviewers produced fewer requests for acknowledgement.

Four functions of second pairparts expressed by the N- and PI-children will be analysed in order to explore the responsivity of the PI-children as compared to the N-children: answer, clarification, acknowledgement and response. The examples show the function-to-form mapping of second pairpart functions. Ideally, the form of an answer or clarification can be a (non)verbal yes/no-answer as response to yes/no-question (Examples 7) or an ellipsis/T-unit as response to an open question (Example 8).
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Example 7

*Answer (Pl-child; age 7;6)*

Interviewer: en zou jij graag een huisdier willen hebben? (and would you like to have a pet at home?)
Jeroen → no. (no)

Example 8

*Clarification (Pl-child; age 7;6)*

Interviewer: trekker spelen? (play trailer?)
Jeroen → ja (yes).
Interviewer: hoe gaat dat dan? (how does it work?)
Jeroen → nou, dan heb je een trekker. (now, then you have a trailer).

The form of an *acknowledgement* elicited by a request for acknowledgement is limited to a (non)verbal yes/no- answer (Example 9).

Example 9

*Acknowledgement (Pl-child; age 6;11)*

Johnny: alleen huizen kan je maken (one can only make houses [with Lego])
Interviewer: ja? (yes?)
Johnny → Ω.
%gesture: nods

The form of a *response* elicited by an assertion or a request for action/attention is limited to a (non)verbal yes/no-answer (Example 10).

Example 10

*Response (Pl-child; age 9;11)*

Interviewer: dus dat was een echte pestpapegaai. (so that really was a teasing parrot)
Stefan → ja.

We made a comparative analysis of the number of second pairparts and different second pairpart functions (answers, clarifications, acknowledgements and answers) in order to gain insight into the N- and Pl-children's responsivity. Problems with responsivity are defined as a significantly lower number of second pairparts (then the amount of extended discourse will be relatively higher), a lower number of answers and a higher number of clarifications. Clarifications concern only the explication of old information and therefore indicate difficulties in giving understandable new information.

Here, we will explore whether the Pl-children *produce as many second pairparts that function as answers and clarifications as the N-children. And, is there comparable development with age?* We expect that with age the number of second pairparts will decrease in favour of an increase of the amount of extended discourse. We also expect on the basis of the Pl-interviewers' eliciting behaviour that younger N- and Pl-children and Pl-children produce relatively fewer answers and more
clarifications and that older N- and PI-children and N-children as a group are more responsive.

11.4.2 Results: Functions of Second Pairparts
From Table 11.5 we see that the production of second pairparts is comparable\(^{24}\) in the PI- and N-children, as might be expected on the basis of the comparable amount of missed turn chances we found in both populations (see 11.3). When we look at possible age effects, we observe - as expected - a comparable linear decrease of the number of second pairparts with age\(^{25}\) in the N- and PI-children (Appendix 11; Table 11b). The age effect is even stronger if we include the nine-year-old PI-children. The influence of development is that the older N- and PI-children no longer only give the information asked for, but produce more extended discourse as a more elaborate reaction to first pairparts expressed by the N- and PI-interviewers.

As expected on the basis of the PI-interviewers eliciting behaviour, we see that the PI-children indeed not only express significantly\(^{26}\) more clarifications, indicating difficulties in giving understandable new information, but also significantly\(^{27}\) fewer acknowledgements than the N-children. With respect to answers and responses no group effects were found.

Table 11.5 The percentage second pairparts (calculated over the number of first pairparts expressed by the interviewer) and their functions in interviews with 75 N-children (Roelofs, 1998) and 100 PI-children (4;0 to 8;11 years)

<table>
<thead>
<tr>
<th>Functions</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=75</td>
<td>n=100</td>
</tr>
<tr>
<td>Second pairparts</td>
<td>45%</td>
<td>46%</td>
</tr>
<tr>
<td>Answer</td>
<td>27%</td>
<td>27%</td>
</tr>
<tr>
<td>Clarification</td>
<td>7%</td>
<td>11%</td>
</tr>
<tr>
<td>Acknowledgement</td>
<td>6%</td>
<td>3%</td>
</tr>
<tr>
<td>Response</td>
<td>5%</td>
<td>5%</td>
</tr>
</tbody>
</table>

When we focus on the influence of development on second pairpart functions (Appendix 11; Table 11b), we do not observe a linear increase\(^{28}\) with age of the production of answers in the PI-children as opposed to the N-children, although requests for information expressed by the PI-interviewers increase with the PI-children's age. The absence of this developmental trend in the PI-children confirms

\(^{24}\) ANOVA: percentage 'second pairparts' on the first pairparts expressed by the interviewer: age effect F(4,165)=8.99, p<0.0001 (nine-year-old PI-children excluded).

\(^{25}\) One-way ANOVA: percentage 'second pairparts' calculated over the first pairparts expressed by the interviewer; N-children: F(4,70)=5.41, p=0.001;Eta squared .23; R squared .18; PI-children: F(5,114)=6.88, p=0.0001;Eta squared .23; R squared .20(nine-year-old PI-children included).

\(^{26}\) idem; group effect F(1,164)=37.41, p<0.0001; age effect F(4,164)=3.56, p=0.008 (nine-year-old PI-children excluded).

\(^{27}\) idem; group effect F(1,164)=84.93, p<0.0001; age effect F(4,164)=6.75, p<0.0001 (nine-year-old PI-children excluded).

\(^{28}\) One-way ANCOVA (Polynomial contrast) with the same covariate: N-children: F(4.69)=3.09, p=0.021; Linearity p=0.0001).
that especially older PI-children seem to have problems with the delivery of new information. They leave more requests for information unanswered (although not significantly; see 11.2) or give pragmatically inadequate, semantically unrelated responses that could not be coded as contingent answers (see 12.4). Remarkably, we observed a linear decrease in the production of clarifications with age in the PI-children comparable to the N-children. This means that the linguistic messages of the PI-children become more intelligible with age. With respect to acknowledgements and responses no linear age effects were found.

11.4.3 Conclusion: Function of Second Pairparts
The PI-children produce as many second pairparts as the N-children. These decrease with age in favour of the production of extended discourse. Despite this quantitative similarity, there are some qualitative differences. For instance, the PI-children had to express more clarifications. These results signal the existence of semantic/pragmatic difficulties in giving understandable, new information, although with age the intelligibility of the PI-children's messages improves: the older PI-children are significantly less frequently asked to give clarifications.

Thus, contrary to what might have been expected on the basis of the developmental literature (e.g. Ninio, Snow, Pan and Rollins, 1994), the results suggest that the PI-children do not have a restricted range of speech act functions. They only have to produce more clarifications, under the influence of the PI-interviewers' requests. These, in turn, are caused by the PI-children's unintelligibility due to other morphological/syntactic problems (see 4.2). The clarifications may still be judged as semantically/pragmatically marked (Chapter 12 and 13), for instance as non-contingent with the content or intention of the request expressed by the PI-interviewer (see 12.4).

11.5 Extended Discourse with a narrative character

11.5.1 Research questions, definitions and operationalisations
Responsivity was also measured by the amount of extended discourse, i.e. successive, communicative contributions with a narrative character. These form a more elaborate reaction to a question asked by the interviewer (Ninio and Snow, 1996).

From the developmental literature, we know that from age three/four on, N-children can give descriptions of routines or explanations (Donaldson, 1986; Schaelaekens and Gillis, 1987; Barbiere, Colavita and Scheuer, 1990) and tell anecdotes (Eisenberg, 1985) in two to three semantically contingent, successive contributions in familiar contexts (Baker, Blankenstein and Roelofs, 1999). From age five on, N-children learn to produce longer stretches of extended discourse, such as jokes, anecdotes and conversational mini-narratives, explanations, definitions, and descriptions (e.g. Pace and Feagans, 1984; Karmiloff-Smith, 1986; Schaelaekens

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29 Oneway ANCOVA (Polynomial contrast) with the same covariate; N-children: F(4,69)= 3.16, p=0.019; Linearity p<0.001; PI-children: F(5,113)= 2.35, p<0.045; Linearity p<0.001 (nine-year-old PI-children included).
and Gillis, 1987; Ninio and Snow, 1996). In order to tell a story about every day events, such as what happened at school, the child must have some knowledge of sequences of events, called script knowledge (Schank and Abelson, 1977) or event knowledge (Nelson, 1986). The child must also have some prototypic script knowledge of basic emotions (Fischer, Shaver and Carnochan, 1990). Furthermore, N-children start to talk about the there-and-then in a rather subjective, impressionistic style (4;0 to 6;0), developing to a more stereo-type, scriptlike style (6;0 to 8;0). From eight/nine years one, N-children learn to combine the two into a rather adult-like, personal style of talking in longer turns (Schober-Peterson and Johnson, 1993; Berman and Slobin, 1994).

Extended discourse with a narrative character was identified by using three criteria. A conversational narrative must contain two or more successive, uninterrupted communicative contributions. These contributions must be connected to one another in a temporal, causal or logical manner, and must refer to an action or a process (Dik, 1989:97; Roelofs, 1998). Each contribution that belongs to extended discourse with a narrative character was coded as narrative Communicative Contribution (NCC). When a contribution immediately follows a first pairparts and can be coded as NCC, it was not scored as having the second pairpart function (Example 11).

**Example 11**  Conversational narrative immediately succeeds first pairpart (Pl-child; age 5;10)

| Interviewer: | en wat nog? (and what more things do you have in your room?) | first pairpart request information |
| Tom:         | mijn vader, die kan toveren. (my father, he can do magic)     | narrative CC                        |
| Tom:         | die had eens een keer een lepel op zaterdag. (once upon a time he had a spoon on Saturday) |
| Tom:         | toen had ie zijn hand erop gedaan. (then he put his hand on it) |
| Tom:         | moest ik zo deronder doen. (I had to do so)                  |
| gesture:    | rub                                                            |
| Tom:         | en toen had je een vijfentwintigje en een honderdje erin. (and then he had twenty-five guilders and hundred guilders in it) |
| Tom:         | maar die was voor hem. (but it was for him)                  |
| Tom:         | ik mocht het niet hebben. (I was not allowed to take it)      |

Conversational narratives contain narrative plot elements, such as an orientation (introduction of characters, place and time), a complication (problems; a highpoint), a resolution (the solution of problems) and a coda (the moral of the story) (Labov and Waletsky, 1967) (Example 12). In a coda feelings or attitudes towards the narrative can be expressed. These narrative plot elements are not further analysed in detail as opposed to the analysis of the Frog story plot components (see 14.3).
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Example 12  Conversational narrative (PI-child; age 7;4)

Sigrid: en ik heb een konijn, een heel rotkonijn.
(and I have got a rabbit, a very nasty rabbit)
Sigrid: die blijkt altijd het gaas kapot.
(he always bites the netting to pieces)
Sigrid: <en die> en dan gaat ie helemaal bij de buren
 complication
 «and that> and then he goes all the way to the neighbours)
Sigrid: moeten we hem helemaal terug gaan halen
 (we have to go and fetch him back home)

NCCs are different from contributions that belong to non-narrative extended discourse. These are coded as assertive Communicative Contributions (ACC). This type of extended discourse contains descriptions or explanations about a situation, thing or state of affairs (Dik, 1989:97; Roelofs, 1998:104), but were not further analysed as such (Example 13).

Example 13  Successive assertive CC's (PI-child; age 7;2)

Interviewer: en wie verzorgt de vissen?
(and who takes care of the fish?)
Pieter: nou, ik verzorg de tuinvissen.
(now, I take care of the garden fish)
Paraphrasis: (now I take care of the fish in the garden)
Pieter: en Joyce zorgt der eigen vis.
(and Joyce takes care of her own fish)

Looking at the spontaneous language production of the N- and PI-children in the conversational interview genre, we not only want to know whether the PI-children are as good as the N-children in the production of extended discourse with a narrative character, but also if there is a comparable development with age.

On the basis of the age effect found in the MLT and MLLT (see 10.4) and the observed increase in extended discourse with a narrative character in the N-children over time (Roelofs, 1998), we expect a similar development in the PI-children, although some differences may be found. For instance, English-speaking PI-children on the autistic spectrum show difficulties in narrating about experiences, ordering them by connecting events by place and time characteristics and by giving experiences a personal value by telling them from their own point-of-view (e.g. Capss, Losh and Thurber, 2000). We therefore expect that the Dutch-speaking PI-children may show similar – although probably less severe – problems in this area, producing more ACC’s than NCC’s.

11.5.2  Results: Extended Discourse with a narrative character

First we checked whether the PI-children produce an amount of extended discourse comparable to the N-children, taking both types together (assertive and narrative). This proved to be the case. The amount increases with age in the PI-children in

30 In Example 12, no coda is expressed, but could have had the form “and I do not like this behaviour” (moral: and therefore I call my rabbit nasty).
31 ANOVA: age effect F(1,165)= 2.55, p<0.041 (nine-year-old PI-children excluded).
the same way as in the N-children (see Roelofs, 1998:89) (Appendix 11; Figure 11b). We have already seen that the PI-children have difficulties in producing Long
Turns (see 10.4). We must therefore conclude that the PI-children produce more, but
shorter turns for their extended discourse and the N-children fewer, but longer turns.

From Figure 11.1, we first see that both N- and PI-children produce relatively more
extended discourse with an assertive character than with a narrative character. Per
interview approximately 33% of all communicative contributions in the N-children
and 29% of all communicative contributions in the PI-children are characterized as
explanation or description of a situation, thing or state of affairs. Per interview
approximately only 20% of all communicative contributions form a conversational
narrative in the PI-children compared to 18% in the N-children.

When we look at the N-children’s development, we see that the N-children produce
relatively many successive assertions at age four and that this amount is quite stable
over time. The data confirm that the production of extended discourse with a
narrative character is a major development in normally developing children during
the school years (Ninio and Snow, 1996).

When we compare the PI-children with the N-children, we see that, contrary to our
expectations, the percentage ACC’s is significantly\(^33\) higher in the N-children (total
mean: 33%) than in the PI-children (total mean: 29%). No linear decrease with age
in the production of ACC’s was observed in either population. The percentage
NCC’s proved to be comparable in the PI-children (total mean: 20%)\(^34\) and the N-
children (total mean: 18%).

According to our expectations, the percentage NCC’s significantly increase with age
in both populations (Roelofs, 1998:108), although at a slower rate in the PI-children
(p<0.044)\(^35\) – mainly caused by the stable amount of conversational narratives
expressed by the six to nine-year-old PI-children – than in the N-children (p<0.014).
However, the PI-children performed better than we had expected.

\(^32\) One way ANOVA \(F(5,114)= 5.01, p<0.0001; \) Eta squared .18; R squared .17 (nine-year-old PI-
children included).

\(^33\) ANCOVA with the number of communicative contributions as covariate; group effect
\(F(1,165)=17.71, p< 0.0001\); no age- or age*group interaction effect (nine-year-old PI-children
excluded).

\(^34\) ANCOVA with the number of communicative contributions as covariate; age effect: \(F(4,164)=3.02,
p<0.014\) (nine-year-old PI-children excluded).

\(^35\) One way ANCOVA with the same covariate (nine-year-old PI-children included).
Figure 11.1  The percentages assertive and narrative communicative contributions that are part of extended discourse expressed by 75 N-children (Roelofs, 1998) and 120 PI-children

11.5.3 Conclusion: Extended Discourse with a narrative character
The production of extended discourse was comparable in both populations and increased linearly with age. Unexpectedly, a comparable amount of extended discourse with a narrative character was produced by the PI-children and N-children. This amount also linearly increased with age in both populations, although at a slower rate in the PI-children than in the N-children. However, these findings say nothing about the quality of the produced extended discourse with a narrative character. The conversational narratives of the PI-children might still contain narrative contributions that possibly can be judged as (partly) incoherent (Chapter 12) or lacking in cohesion (Chapter 13).

11.6 Repairs and Requests for Clarification expressed by the child
11.6.1 Research questions, definitions and operationalisations
When requests for clarification and repairs are expressed, they function as a strategy to keep the conversational going. Requests for clarification, as we have seen, are usually produced by the N- and PI-interviewers (see 11.1). The analysis of the production of repairs by the N- and PI-children gives insight in their ability to deal with ambiguous or inadequate information and to resolve communicative misunderstandings (e.g. Roth and Spekman, 1984; Brinton, Fujiki and Sonnenberg, 1988). Producing repairs and requests for clarification both involve a process of
monitoring the communicative interaction in order to prevent potential communicative breakdowns (Evans, 1985; McTear and Conti-Ramsden, 1992).

Repair can take place in many different layers of communication. Children can use repairs, for instance, to correct a wrong presupposition or formulation of the interviewer, coded as repair interviewer (Example 14).

Example 14  Repair interviewer (PI-child; age 9;2)

Interviewer:  en dan houdt ie op met het gras kapot maken?
            (and then he stops destroying the grass ?)
Bryan:→  het gras slopen.
            (demolish the grass)

In Example 14, the PI-child changes 'kapot maken' (destroy) into 'slopen' (demolish) although this verb is not correct in combination with the object 'grass'. The fact that the correction in itself was incorrect is not important here. The repair was always scored in order to gain insight in linguistic monitoring.

Children can also correct themselves, coded as self repair. This includes morphological/syntactic and semantic/pragmatic self-corrections, which are both motivated by the need to be understood (Clark and Andersen, 1979; in: McTear and Conti-Ramsden, 1992). Children also have to learn to repair inaccessible information (e.g. 'what did you say?'), turn disruptions ('sorry for interrupting') and unclearness about the intention of the speaker ('what do you want to say?') (e.g. Ninio and Snow, 1996).

This important semantic/pragmatic ability illustrates not only children's intention to prevent potential communicative breakdown, but also their attempts to adapt their message to the listener's needs, signalling intersubjectivity (see 2.3.3). Many miscommunications stay unrecognized, or even when recognized, remain unresolved. Some are severe enough to make further conversation impossible unless they are repaired (e.g. Ninio and Snow, 1996).

In order to make a functional analysis of repairs and requests for clarification expressed by the N- and PI-children, we first counted all repairs and all first pair parts that function as requests for clarification as opposed to a request for information (Example 15).

Example 15  First pair part: request for information (PI-child: age 8;1); conversational topic: 'mini-Chinchilla's' (rat-like pet)

Esther:  heb je die wel eens gezien?
         (have you ever seen them?)

Children sometimes produce requests for information, for instance, they want to know where the interviewer lives, how old the interviewer is, if the interviewer has

36 False starts or phonological word corrections within one communicative contributions fall outside the category repair. They were transcribed and put between brackets <>, but were not further analysed.
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seen a particular football game, and so on. In this genre, this behaviour can be interpreted as inappropriate friendliness or keeping too little social distance (Example 15). Breaking the rule might be seen as quite charming in younger children, but as children get older this behaviour is judged more negatively in the conversational interview genre. As mentioned above, PI-children on the autistic spectrum have been found to use such questions as routines to initiate and maintain social contact (Hurtig, Ensrud and Tomblin, 1982).

Next to requests for clarification and information, we had to divide a third category other, consisting of both requests for action/attention and first pairpart assertions. These functions were frequently used by children to move to the here-and-now and thus escape from the interview task (Example 16).

Example 16 First pairpart child; request for action (PI-child; age 4;5)

Bas: en mag ik ook aan deze?
(and can I touch this one?)

As mentioned above, communicative breakdowns can also be repaired by using first pairpart self-initiated requests for clarification as opposed to first pairparts request for information. Whereas requests for clarifications are signs of semantic/pragmatic complex behaviour, requests for information are judged as semantically/pragmatically marked behaviour. Here, we want to know whether the PI-children produce as many repairs and requests for clarification as the N-children. And, is there comparable development with age?

Although self-initiated requests for clarification have been observed in English-speaking two-year-old N-children (Foster, 1990; Ninio and Snow, 1996), it has been frequently reported that (young) N-children (Ironsmith and Whitehurst, 1978) and especially (SLI) children produce repairs relatively infrequent. They have not yet acquired or are delayed in the acquisition of these communication monitoring skills (Bryan, Donahue and Pearl, 1981; Markman, 1981; Brinton, Fujiki and Sonnenberg, 1988; Purcell and Liles, 1992). Leonard (1986), however, reports different results in English-speaking (S)LI-children who produced relatively more requests for clarification than same-aged N-children.

It has been suggested that N-children between two and six years of age (and older LI-children) might erroneously assume that adults' messages are always clear or when they correctly assume that an adult's message is unclear, they are reluctant to indicate otherwise (Jackson and Jacobs, 1982; Bredart, 1984). Before age seven/eight, N-children might therefore avoid resolving communicative breakdowns. Others suggest that N-children within the age range of 2;0 to 8;0 years show an inability to recognize and repair breakdowns (e.g. McTear and Conti-Ramsden, 1992).

We therefore expect that the PI-children as a group and younger N- and PI-children express more requests for information, because they have not yet developed a feeling for role-awareness, and express fewer requests for clarification and repairs,
because they have not yet developed the ability to resolve conversational breakdowns.

11.6.2 Results: Repairs and Requests for Clarification expressed by the child

From Table 11.6 we see that the amount of repairs (N-children: 1%; PI-children: 1%) and requests for clarification (N-children: 0.55%; PI-children: 0.35%) are low, similar to earlier reports (e.g. Ironsmith and Whitehurst, 1978). A closer look at the data shows that there are, however, some points at which the N- and PI-children give wrong or non-contingent answers (see 12.4) and thus could and probably should have used a repair strategy, such as a request for clarification.

Table 11.6 The percentage repairs and requests for clarification as one of the possible first pairpart functions (calculated overall communicative contributions) expressed by 75 N-children (Roelofs, 1998) and 100 PI-children (4:0 to 8:11 years)

<table>
<thead>
<tr>
<th>First pairpart functions</th>
<th>N-children n=75</th>
<th>PI-children n=100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repairs</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Total First pairparts</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Request for information</td>
<td>0.16%</td>
<td>0.54%</td>
</tr>
<tr>
<td>Request for clarification</td>
<td>0.61%</td>
<td>0.37%</td>
</tr>
<tr>
<td>Other</td>
<td>0.23%</td>
<td>0.08%</td>
</tr>
</tbody>
</table>

With respect to the amount of repairs\(^{37}\) and first pairparts\(^{38}\) no group effect was found. From Table 11.6 we see that the PI-children produce significantly more requests for information\(^{39}\) than the N-children but significantly\(^{40}\) fewer requests for clarification. The PI-children's self-initiated requests for information were mostly ignored by the PI-interviewers, whereas the requests for clarification expressed by the N-children were always answered.

Although the percentages are small, the amount of requests for information signal salient semantically/pragmatically marked behaviour in the conversational interview genre; only a few instances per interview may already be an indication for language impairment in the area of semantic/pragmatics. In the N-children, the production of requests for information decreases with age, starting between age five and six (Roelofs, 1998:88 and Roelofs, 1998:109). The older PI-children, however, express significantly more requests for information than the older N-children (Appendix 11; Table 11c). Like LI-children with semantic-pragmatic disorder, these PI-children

\(^{37}\) ANCOVA with the number of communicative contributions expressed by the children as covariate (nine-year-old PI-children excluded).

\(^{38}\) ANOVA: age effect F(4,165)=4.48, p<0.002 (nine-year-old PI-children excluded).

\(^{39}\) ANCOVA with the number of first pairparts as covariate; group effect F(1,164)= 14.78, p<0.00014 (nine-year-old PI-children excluded).

\(^{40}\) ANCOVA with the number of first pairparts as covariate; group effect F(1,164)= 5.22, p<0.024 (nine-year-old PI-children excluded); no linear age effects were observed in either N-children (Roelofs, 1998:109) or PI-children.
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may use questioning as a strategy to avoid being asked more questions that they find difficult to cope with (e.g. Brinton and Fujiki, 1982; Bishop and Adams, 1989:255). On the other hand, like LI-children in everyday communication (Bryan, Donahue and Pearl, 1981; Markman, 1981), the PI-children seldom repair miscommunication by expressing requests for clarification in the conversational interview genre. The small percentages indicate that most PI-children did not express any request for clarification; this can be related to difficulties in noticing mild morphological/syntactic or semantic/pragmatic inconsistencies in order to repair them (Jackson and Jacobs, 1982; Bredart, 1984). However, since the amount of requests for clarification are also very low in the N-children, the most plausible explanation is that N- and PI-children in this age range show a tendency to avoid communicative misunderstandings by simply ignoring them; the 'official' situation, being interviewed by an unknown person in an official setting, may also play a part, since the N- and PI-children may have ignored misunderstandings in order to be polite or to avoid losing face (Furrow and Lewis, 1988; McTear and Conti-Ramsden, 1992).

11.6.3 Conclusion: Repairs and Requests for Clarification expressed by the child

Some PI-children and N-children produce a small amount of repairs (1%) and requests for clarification (less than 1%) in the conversational interview genre. The PI-children as a group express significantly more requests for information and fewer requests for clarification than the N-children. These results may signal not only the existence of semantic/pragmatic problems with role-awareness and keeping social distance in some PI-children, who asked questions that were over-friendly or over-personal (e.g. Bishop and Adams, 1989), but also difficulties in solving miscommunication.

11.7 General conclusions: the ability to repair and to be responsive

We found differences in interview style, namely that the PI-interviewers adopted a communication facilitating style, characterized by long pauses to give the children time to think (see 10.4) and by more linguistic support and structuring, for instance by giving more feedback and asking more prerequisites. The PI-children were performing as well as the N-children, with respect to responsivity, measured by the amount of missed turn chances, second pairparts and extended discourse with a narrative character. This is possibly due to the PI-interviewers' style. The PI-children are comparable to the N-children in the amount of missed turn chances. This is different from English-speaking pragmatic LI-children (e.g. Bishop et al., 2000) and is probably the result of the PI-interviewers' patience in waiting relatively long for an answer. But contrary to the N-children, most breaks were caused by the PI-children who started but did not finish their turn, probably having difficulties in planning the content and form of the next turn, while remembering the information asked for (see 2.2 and 2.3.1). The PI-children produce as many second pairparts as the N-children and these decrease with age in favour of the production of extended discourse. Beside this quantitative similarity, there are some qualitative differences. For instance, the PI-children have to express more clarifications. These results indicate more
semantic/pragmatic difficulties in giving understandable, new information, although with age the intelligibility of the PI-children's messages improves. The younger PI-children express an amount of conversational narratives comparable to the N-children, but the older PI-children lag somewhat behind. The quality of conversational narratives will be evaluated for coherence (Chapter 12) and cohesion (Chapter 13). Unlike earlier findings (Ninio, Snow, Pan and Rollins, 1994), the PI-children do not appear to have a restricted range of speech act functions in the conversational interview genre. They only have to produce more clarifications, since their messages are less intelligible.

A clear difference, however, can be seen in the amount of minimal answers. The PI-children, even in the oldest age groups, give significantly more minimal responses, especially more (non-)verbal yes/no answers, than the N-children. And, unlike the N-children who were able to respond to first pairparts independent of their function and/or form, the PI-children give significantly more minimal responses to indirect requests for information and clarification in the closed-question interrogative or declarative form. This result shows that the PI-children have severe difficulties in their semantic understanding of non-literal meaning and pragmatic understanding of indirect intentions.

As expected, the amounts of repairs and requests for clarification are small in the conversational interview with N- and PI-children. The PI-children as a group produce an equal low amount of repairs but significantly fewer requests for clarification than the N-children. Instead, the PI-children produce more semantic/pragmatically marked requests for information.

Thus, despite the PI-interviewers' fine tuned eliciting interview style, the PI-children as a group – but older PI-children even more so – are less responsive, since more than one third of all requests for information and of all requests for clarification expressed by the PI-interviewers elicited only minimal responses. In addition to possible morphological/syntactic difficulties (Chapter 5 to 9), we showed that this was partly related to difficulties in understanding indirect requests and an inability to resolve this semantic/pragmatic misunderstanding.
The ability to transmit relevant information

Claudia Blankenstijn

12.1 Introduction

In the previous chapters, we described the PI-children's semantic/pragmatic (dis)abilities with respect to turn taking abilities at the structural level (Chapter 10) and at the functional level, mainly with respect to responsiveness (Chapter 11). In the following three chapters, we will explore the ability to transmit relevant information at the content level (Sperber and Wilson, 1986).

The issue of 'what is relevant information' is difficult and complex. It can be said, however, that relevance is, among other things, dependent on the intelligibility of the implicit and explicit semantic relationships between and within communicative contributions. Thus, in the conversational interview genre, a contribution is optimally relevant when it is easy for the interviewer to understand the connections between the old and the new information with a minimum of processing effort. This effort can be minimised by the child by making the form and content of the contribution as clear as possible (e.g. Sperber and Wilson, 1986). Ideally, both children and interviewer are trying to maximize relevancy. In the course of their development, children have to learn what information is relevant in many different communicative situations, taking into account the listener's point-of-view. In everyday life, the environment or the situation is of great influence on what is relevant (to do or) say next. In the interview-situation the influence of environmental factors is reduced. Only what is said in the interview is of influence on what is relevant to say next.

In general, two aspects that play a part in the linking of communicative contributions are distinguished, namely coherence and cohesion. Coherence is the semantic connection between contributions that involves some knowledge of the world for its interpretation. Cohesion is the semantic connection between linguistic elements when the interpretation of the meaning of one linguistic element is dependent on another linguistic element in the same contribution or beyond (e.g. Renkema, 1993). The contributions that are semantically most closely connected, are related to one conversational discourse topic (Brown and Yule, 1983; Schober-Peterson and Johnson, 1993). Usually, conversational topics change gradually over time, so that two successive turns of talk are related to one another, but communicative contributions three or four turns apart might be on different topics (e.g. Ninio and Snow, 1996). In the conversational interview genre, the amount of coherently and cohesively linked contributions that add new information to the conversational topic is seen as globally indicative for the ability to be relevant (e.g. Grice, 1975; Brown and Yule, 1983).

We expect that children will improve their semantic/pragmatic ability to transmit relevant information. Ideally, both children and interviewer try to make a clearly coherently and cohesively linked whole from a given sequence of contributions. Coherence and cohesion thus largely depend on the co-operation between
participants. To do this, a fine-tuning mechanism is required that involves taking into account each other's point-of-view and knowledge of the world. Children have to acquire these abilities that are part of their development of a Theory-of-Mind (ToM) (see 2.3.3). On the basis of the developmental literature (e.g. Cohen, Kershner and Wehrspan, 1985; Cohen et al., 1998; Vallance, Im and Cohen, 1999), we expect that most PI-children will have difficulties to transmit relevant linguistic information that requires such fine-tuning mechanisms. Here, we want to explore whether the PI-children have difficulties in this area compared to the N-children.

For this semantic/pragmatic analysis, we used the model for topic management (Roelofs, 1996), the model for coherency (Roelofs, 1996) and the model of cohesion (Blankenstijn, 1996; Roelofs, 1996; Scheper, 1996). According to the model for topic management, for instance, the amount of topic continuations can be scored. According to the model of coherency, it is possible to judge whether or not children follow the semantic/pragmatic rules for co-operativeness, according to the different Maxims as defined by Grice (1975). When communicative contributions are not coherently linked to the ongoing conversation, they can be judged as a violation of one of these Maxims. According to the model of cohesion, it is possible to judge whether contributions are appropriately cohesively linked by the use of different linguistic means, as will be described in more detail in Chapter 13.

In the following, we will first describe the PI-children's ability to manage the conversational topic (12.2). We will then explore their ability to be coherent by following the Maxims of Grice (1975) (12.3) divided into the Maxim of Relation (12.4), the Maxim of Relevance (12.5), the Maxim of Quantity (12.6 and 12.7) and the Maxim of Quality (12.8), and we will end with the general conclusions with respect to the ability to transmit relevant information (12.9).

12.2 Topic Management

12.2.1 Research questions, definitions and operationalisations
Here, we will focus on the development of the ability to manage the conversational topic. Successful participation in the interview requires that children not only understand the questions asked and identify the main information asked for, but also formulate a topic-related response. When children discuss certain topics in detail, they should link successive communicative contributions coherently and cohesively. By giving intelligible, new and thus relevant information, covering one topic in extended discourse with a narrative character (see 11.5), children influence the quality of the interview positively. Thus, the amount of topic continuations per interview expressed by children has a positive influence on the quality of the interview.

School-aged children have to acquire the ability to continue a certain conversational topic with minimal support, like telling jokes or funny anecdotes at the dinner table. In more competitive situations, where others want to interrupt, children also have to acquire the ability to maintain their conversational topic. This is seen as an area of
The ability to transmit relevant information

major development during the school years (Ninio and Snow, 1996). Previous research (Roelofs, 1998) showed that in the older Dutch-speaking N-children, the ability to link contributions between and within conversational topics, e.g. the ability to manage the conversational topic in the interview genre, improved. This development is comparable to earlier reports with respect to English-speaking N-children (Brinton and Fujiki, 1984; Hoff-Ginsberg, 1987; Adams and Bishop, 1989; Schober-Peterson and Johnson, 1993).

Some reports have shown that LI-children have difficulties in topic continuation and management (Fey and Leonard, 1983; Johnson, Johnston and Weinrich, 1984; Van den Dungen and Verboog, 1993; Craig and Evans, 1993), although others do not (Rosinski-McClendon and Newhoff, 1987). LI-children have been reported to keep the conversation going on familiar topics, thus avoiding complex topics, unfamiliar vocabulary areas etc. (e.g. Bishop and Adams, 1989). However, little is known about the relative speed of this development and the kind of deficiencies in PI-children. In PI-children with an internalizing disorder additional difficulties have been found with topic management, i.e. the ability to introduce, maintain and continue topics by adding new information (Valiance, et al., 1999).

Here, we will explore the ability to manage the conversational topic by the PI-children compared to the N-children. But first, it is important to consider how far differences in interview style between the N-interviewer and PI-interviewers may have influenced the conversational behaviours to be described here (e.g. Bishop et al., 2000).

Differences in interview style

When different speakers co-operate, the conversational topic is developed equally by them depending on their personal interests and underlying goals in the conversation. Mostly this leads to a systematic structuring of conversational topics (Ochs-Keenan & Schieffelin, 1979; Levinson, 1983). In the conversational interview genre, the situation is unbalanced. Since it is the interviewer's task to elicit language from the children, they try to follow the children as much as possible in their development of conversational topics, but take over as soon as the children have nothing more to say by asking further questions or elaborating on responses (Schley and Snow, 1992). Thus, whenever children willingly and spontaneously respond by extended discourse, the interviewers keep silent and support the children only by feedback (see 11.1). This is in accordance with the STAP procedure (Van den Dungen and Verbeek, 1999).

As was also mentioned in 11.1, the PI-interviewers may have facilitated the PI-children in continuing conversational topics by waiting with patience for answers to come on questions about a topic. Here, the PI-interviewers also may help the PI-children because they introduce and pursue topics which they think the PI-children can manage (e.g. Sinclair and Coulthart, 1995). The PI-interviewers only pursue those topics introduced by PI-children which are within the permitted topics for the STAP procedure (see 3.4.2). Uninterpretable, incoherent or irrelevant contributions not within this conversational topic plan, tend to be ignored or to be clarified (Smith and Leinonen, 1992:133). The PI-interviewers may have been more facilitating with respect to topic management than the N-interviewer.
In order to answer the question whether the PI-children manage the conversational topic as well as the N-children, we first analyse how the PI-interviewers differ in structuring conversational topics compared to the N-interviewer.

Following Roelofs (1996), the following coding categories for the analysis of topic management are used, mainly reflecting new (appropriate semantic/pragmatic behaviour) versus old information.

With respect to new information, the following three options are possible: (1) topic introduction, when the expressed information is brand-new, (2) topic continuation, when more detailed information is given about the same content expressed in the preceding contribution(s), (3) topic link, when the information is partly linked to the content expressed in the preceding contribution(s).

With respect to old information the following two options are possible: (4) resumed topic, when a conversational topic that has been finished is resumed (Example 1).

**Example 1**  
Resumed topic expressed by the PI-interviewer (PI-child, age 8:2)

Interviewer: en kun je nog iets over jullie hond vertellen, over Rex?  
(and can you tell me something more about your dog, about Rex?)

This is also scored when the interviewer resumes a topic after a child has side-tracked. This is the case when topic digression takes place (e.g. Renkema, 1993). Topic hold (5) is scored when the information of a previous contribution is repeated and no new information is added.

In order to choose between one of the five coding categories, we first looked at the whole interview to decide what the interview was about, globally differentiating different conversational topics (top-down). We decided for each communicative contribution how the information expressed was linked to the ongoing conversational topic (bottom-up). In Table 12.1 we present the topic management by the PI-interviewers compared to the N-interviewer.

<table>
<thead>
<tr>
<th>Topic Management</th>
<th>N-Interviewer (n=1)</th>
<th>PI-Interviewers (n=2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topic introduction</td>
<td>74.4%</td>
<td>57.2%</td>
</tr>
<tr>
<td>Topic continuation</td>
<td>7.0%</td>
<td>4.1%</td>
</tr>
<tr>
<td>Topic link</td>
<td>54.5%</td>
<td>23.2%</td>
</tr>
<tr>
<td><strong>Old information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topic resumed</td>
<td>25.6%</td>
<td>42.8%</td>
</tr>
<tr>
<td>Topic hold</td>
<td>19.5%</td>
<td>34.8%</td>
</tr>
</tbody>
</table>
From Table 12.1, we see that the PI-interviewers produce significantly fewer topic introductions and topic continuations (new information), but significantly more resumed topics and topic holds (old information) than the N-interviewer. Surprisingly, the PI-interviewers also produced more topic links than the N-interviewer. With the older children, both PI-interviewers and N-interviewer produced significantly fewer topic holds (linear decrease), influencing the quality of the interview positively.

These results indicate that the PI-interviewers spend more time clarifying or resuming old information and therefore have less time to spend on brand-new information compared to the N-interviewer. A comparable pattern of communicative interaction was found in 12 Dutch-speaking mothers of Specific LI-children younger than four years of age: these mothers spent significantly more time on old information than 6 Dutch-speaking mothers of same-aged N-children (Van Balkom, 1991).

When not enough satisfactory information about a certain topic was given by N-children, more requests for new (topic introduction) or detailed (topic continuation) information easily were expressed by the N-interviewer by using leading questions. Contrary to this semantic/pragmatic behaviour, a relatively low amount of topic introductions and high amount of topic links expressed by the PI-interviewers show that they frequently had to use the strategy of topic shading (Brinton and Fujiki, 1984). Topic shading is defined as the frequent, successive use of topic links. Topic shading had to be used relatively frequently by the PI-interviewers in order to avoid the PI-children difficulties with talking about one topic in detail.

Whenever the PI-interviewers found a conversational topic PI-children were able and willing to talk about, the PI-interviewers frequently chose to express topic links in order to talk as long as possible about related topics. They avoided leading
questions about brand-new topics (topic introduction) and questions that ask for more detailed information (topic continuation). From experience they knew that there was a risk of eliciting minimal responses or getting no response at all (see 11.7). Thus, the conversational strategy of topic shading proved to be the most useful in interviews with PI-children (Example 2).

Example 2

**Topic link expressed by the PI-interviewer (conversational topic is a writing contest)**

(PI-child; age 8.2)

Tanja:

Interviewer:-

ik heb niet gewonnen

(I did not win)

ga jg het de volgende keer nog weer proberen?

(are you going to try it the next time?)

In Example 2, the conversational topic 'winning a writing contest' is not discussed in detail by means of questions such as 'why did you not win?' or 'was it difficult to win?' and so on. The PI-interviewer asked the PI-child about future plans with respect to writing contests, scored as topic link.

In sum, we have the impression that the PI-interviewers stimulated the PI-children in their performance. If they had expressed as many topic introductions and continuations as the N-interviewer, increasing the pressure on the PI-children to come up with more new and detailed information about a certain conversational topic, many PI-children would not have been able to fulfil the interview task. In the following, we will investigate whether the PI-children are performing worse than the N-children with respect to topic management. If the PI-children are, this is probably despite the support of the PI-interviewers.

In order to answer this question, we use the same coding categories as described above. We judged whether the content of communicative contributions expressed by the N- and PI-children concern new information, such as topic introductions, topic continuations and topic links, or whether they concern old information, such as topic holds. In the following, we will explain each coding category in more detail.

A **topic introduction** is scored if the information expressed by the child concerns new information. This is the case when children ask for information; these were mostly judged as pragmatically marked, as the interviewer is expected to introduce the topics of conversation (Peterson and McCabe, 1992) (see 11.6) (Example 3).

Example 3

**Topic introduction expressed by the child (PI-child; age 5;10)**

Interviewer:

en hoe zagen jullie dan dat tie niet dood was?

(and how did you see that he was not dead?)

Tommy:-

#3 nou <eh> weet jg, wat mijn papa weleens gedaan heb?

(#3 now do you know, what my dad has done once?)

The differentiation between topic continuations and topic links is important in order to detect children's difficulties with topic management. A high amount of topic continuations reflects that children are able to tell more in detail about one topic.
The ability to transmit relevant information

A high amount of topic links reflects that children are only able to produce more loosely and associatively connected information, whereby the topic slightly shifts from one contribution to the other (topic shading). The strategy of topic shading used by the children might differ from this strategy used by the interviewers; children presumably avoid morphological/syntactic and semantic/pragmatic difficulties, whereas interviewers avoid communication breakdowns.

Until now no model presents unambiguous criteria to differentiate topic continuations from topic links (Renkema, 1993:65). Topic continuation is coded when something new is said about an already known topic, mostly expressed by contributions that are part of extended discourse with a narrative character (see 11.5). In order to differentiate topic continuations from topic links, we looked for old information (mostly in topic-position; referred to with pronouns; not accentuated by metalinguistic intonation features) as opposed to new information (mostly in focus-position; referred to with noun(phrase); accentuated) within each communicative contribution (e.g. Dik, 1989; Renkema, 1993; Roelofs, 1998:35) (Examples 4 and 5). In both examples old information in topic-position is underlined and new information in focus-position is presented in italics.

**Example 4**  
Topic continuation expressed by the child; conversational topic is the child’s cat (P1-child; age 4:8)

Interviewer: en gaan jullie weleens samen spelen? (and are you sometimes playing together?)
Jeroen: ja. (yes).
Interviewer: wat doen jullie dan? (what are you doing then?)

In Example 4, the conversational topic can be discussed in more detail by answering a wh-questions (where, when, how) expressed by the interviewer (Mazeland, 1992) about the NP in topic-position ‘jullie’ (you) that is the same as the NP in topic-position of the previous communicative contribution ‘jullie’ (you). The new information in focus-position ‘wat’ (what) is semantically closely related to the ongoing conversational topic ‘samen spelen’ (playing together).

**Example 5**  
Topic continuation expressed by the child; conversational topic is the child’s dog (P1-child; age 4:11)

Interviewer: vertel ò eens iets over de hond. (tell ò something about the dog)
Rick: hij houdt van vlinders. (he loves butterflies)
Rick: <hm> hij speelt met # <eh> twee voeten omhoog (he plays with # <eh> two feet in the air)

In Example 5, the NP in topic-position ‘hij’ (he) is the NP in focus-position of the previous communicative contribution ‘de hond’ (the dog). The information in focus-
position 'houdt van vlinders' (loves butterflies) is new and related to the ongoing conversational topic 'de hond' (the dog).

A *topic link* can also be expressed by children, gradually changing the conversational topic to another point of view, expressing things from a different line of approach (topic shading) (see also Mazeland, 1992:81) (Example 6).

**Example 6**  
*Topic link (PI-child; age 8;0)*

Natascha:  
*ik heb ook een Barbie boek.*
(I have got also a Barbie book)

Natascha:  
*en daar zitten Barbie stickers in.*
(and it has got Barbie stickers in it)

Natascha:  
*en <dan ga ik> misschien ga ik Barbie stickers sparen.*  
(topic link)  
(and maybe I will collect Barbie stickers)

In Example 6, the new information in focus-position shades (changes) per communicative contribution from 'Barbie book' to 'Barbie stickers' to 'collecting Barbie stickers'. It seems that the child expresses associative items that all are loosely connected to 'playing with Barbies', jumping from one item to the other. *Topic shading* is probably a milder form of what Bishop and Adams (1989:254) call *topic drift*. This was coded when the English-speaking LI-children they studied drifted off into talk about something that was connected to the original conversational topic, but not really in a relevant way (see also 12.6 on 'elaboration'). Relevancy is, of course, a question of degree.

A *topic hold* is coded when the conversational topic is repeated. The information asked for concerns old information, such as expressed by a request for clarification, or the information expressed is already known and redundant, like repetitions (Example 7) (12.6).

**Example 7**  
*Topic hold expressed by the child (PI-child; age 5;10)*

Tommy:  
*maar die (speelgoedje) is helemaal kapot gegaan*  
(but that (little toy) is totally broken)

Interviewer:  
oh.

Tommy:  
*ik heb hem laten vallen.*  
(I let it fall)

Tommy:  
*toen ging die kapot.*  
(then it broke)

In Example 7, the information 'toen ging die kapot' (then it broke) is repeated and therefore the whole contribution is coded as *topic hold*.

In sum, the amount of topic continuations per interview is globally indicative of the N- and PI-children's ability to transmit relevant information. In the conversational interview genre, topic introductions and topic links, both concerning *new* information, and especially topic holds, concerning *old*, redundant information, are signs of an inability to manage the conversational topic.
12.2.2 Results: Topic Management

In Table 12.2 it is shown that the PI-children do most of the time what is expected, that is they mostly talk about topics introduced by the interviewer, although the PI-children show this behaviour less frequently than the N-children.

Table 12.2 Mean total percentages of topic continuations, topic links, topic introductions, and topic holds (calculated over communicative contributions) expressed by 75 N-children (Roelofs, 1998) and 120 PI-children

<table>
<thead>
<tr>
<th>Topic Management</th>
<th>N-children (n=75)</th>
<th>PI-children (n=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New information (total)</td>
<td>92.7%</td>
<td>87.3%</td>
</tr>
<tr>
<td>Topic continuation</td>
<td>81.0%</td>
<td>69.7%</td>
</tr>
<tr>
<td>Topic link</td>
<td>10.1%</td>
<td>15.8%</td>
</tr>
<tr>
<td>Topic introduction</td>
<td>1.6%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Old information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topic hold</td>
<td>7.3%</td>
<td>12.7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Despite the guidance of the PI-interviewers, the PI-children transmit far less new, detailed information about the ongoing conversational topic. The PI-children thus transmit far less relevant information than the N-children. First, the PI-children produce significantly fewer topic continuations and more topic links than the N-children. The PI- and N-children are comparable, however, in their very small amount of initiatives to introduce a new topic. Second, the PI-children produce significantly more topic holds than the N-children.

The development of the production of topic continuations is shown in Figure 12.1. We observed a linear increase in topic continuations in the N-children, but this is not found in the PI-children.

---

7 ANOVA with the number of communicative contributions as covariate: (F(1,164) = 63.43, p< 0.0001); age effect: (F(4,164)=10.01, p<0.0001); age*group interaction effect: (F(4,164) = 2.86, p<0.025 (nine-year-old PI-children excluded).
8 ANCOVA with the number of communicative contributions as covariate: group effect (F(1,164)=33.54, p< 0.0001); age effect F(4,164)=6.41, p< 0.0001); age*group interaction effect (F(4,164)=4.89, p<0.001)(nine-year-old PI-children excluded).
9 As opposed to the analysis of first pairparts expressed by the children (11.6), the topic introductions expressed by the first contribution of a narrative episode/extended discourse with a narrative character are included.
10 ANCOVA with the number of communicative contributions as covariate: group effect (F(1,164)=37.28, p<0.0001); age effect (F(4,164)=2.79, p<0.028); No age*group interaction effect was found (nine-year-old PI-children excluded).
11 Oneway ANCOVA with the same covariate: F(4,69)=8.47, p< 0.0001; Linearity: p<0.0001).
Figure 12.1  
The percentage topic continuations (calculated over all communicative contributions coded for topic) expressed by 75 N-children (Roelofs, 1998) and 120 PI-children.

<table>
<thead>
<tr>
<th>Age</th>
<th>N-chi: % topic cont</th>
<th>PI-chi: % topic cont</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 yrs</td>
<td>72.3</td>
<td>62.4</td>
</tr>
<tr>
<td>5 yrs</td>
<td>80.2</td>
<td>72.1</td>
</tr>
<tr>
<td>6 yrs</td>
<td>83</td>
<td>78.6</td>
</tr>
<tr>
<td>7 yrs</td>
<td>83.1</td>
<td>67.3</td>
</tr>
<tr>
<td>8 yrs</td>
<td>86.5</td>
<td>68.1</td>
</tr>
<tr>
<td>9 yrs</td>
<td>79.9</td>
<td></td>
</tr>
</tbody>
</table>

From Figure 12.2 it is obvious that in interviews with four to eight-year-old N-children the strategy of topic shading is quite frequently used (around 10% of all contributions) (see Brown, 1973 for the 10%-criterion).

Figure 12.2  
The percentage topic link on all communicative contributions coded for topic expressed by 75 N-children (Roelofs, 1998) and 120 PI-children.

<table>
<thead>
<tr>
<th>Age</th>
<th>N-chi: % topic link</th>
<th>PI-chi: % topic link</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 yrs</td>
<td>11.8</td>
<td>18.6</td>
</tr>
<tr>
<td>5 yrs</td>
<td>11.1</td>
<td>10.7</td>
</tr>
<tr>
<td>6 yrs</td>
<td>9</td>
<td>10.7</td>
</tr>
<tr>
<td>7 yrs</td>
<td>11.1</td>
<td>19.4</td>
</tr>
<tr>
<td>8 yrs</td>
<td>7.5</td>
<td>19.3</td>
</tr>
<tr>
<td>9 yrs</td>
<td></td>
<td>13.4</td>
</tr>
</tbody>
</table>

This means that N-children within this age range are quite associative in the way they manage conversational topics. Topic links significantly linear decrease\(^\text{12}\) with

\(^{12}\) One way ANCOVA with the same covariate, N-children (F(1,169)=2.60, p<0.043; Linearity: p<0.000).
age in the N-children, especially from eight years on. This suggests that the major development of reducing topic links takes place beyond age eight. However, no data are available on the amount of topic links expressed by Dutch-speaking adults in the conversational interview genre.

From Figure 12.2 we also see that the PI-children produce more topic links than the N-children as a group. The significant group effect was mainly caused by the four-, seven- and eight-year-old PI-children. We have no explanation for the relatively low amount of topic links produced by the five- and six-year-old PI-children, although this percentage was still around 10% (Brown, 1973). Topic links significantly linear decrease with age in the N-children, but not in the PI-children. The nine-year-old PI-children produce an even higher amount of topic links than the four-year-old N-children.

Ideally, topics are organized in two ways: (1) more general information is expressed before more specific information, and (2) more salient information is expressed before less salient information (Van Dijk, 1977; Roelofs, 1998). Children have to learn to make a choice between these two important organizing principles, as the more specific information is frequently also the most salient.

A closer look at the data reveals that in the PI-children the most salient information is quite frequently triggered by what they think is the most salient from their own point-of-view, resulting in more topic links. This is comparable to N-children as young as three or four years (Hulit and Howard, 2002). Many PI-children, even in the oldest age groups, cannot determine that the information asked for by the PI-interviewer is the most salient at that moment in conversation.

In the conversational interview genre, in general the interviewer introduces new topics. We see from Figure 12.3 that there is no significant group effect, but a significantly\(^\dagger\) linear decrease of topic introductions with age in both N- and PI-children. This result reflects that the PI-children develop role awareness as quick as the N-children: they learn with age that an interviewee should just respond to topics introduced by the interviewer in the conversational interview genre. However, we have already shown that when topic introductions are expressed by requests for information, judged as semantically/pragmatically marked behaviour, the PI-children do this significantly more frequently than the N-children (see 11.6.2). In section 12.3, we will explore whether topic introductions can be judged as marked and as violating the Maxim of Relation, being coded then as unmarked topic shift.

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\(^\dagger\) Oneway ANCOVA (Polynomial contrast) with the same covariate: N-children (F(1,69)=4.77, \(p<0.002\); Linearity \(p<0.0001\)); PI-children (F(5,113)=5.0, \(p<0.0001\); Linearity \(p<0.0001\)) (nine-year-old PI-children included).
Figure 12.3  The percentage topic introductions (calculated over all communicative contributions coded for topic) expressed by 75 N-children (Roelofs, 1998) and 120 PI-children.

In Figure 12.4, we present the development of age of the production of topic holds. As we already mentioned, the PI-children repeat old information that is redundant and express contributions that contain no new information more frequently than the N-children.

Figure 12.4  The percentage topic hold (calculated over all communicative contributions coded for topic) expressed by 75 N-children (Roelofs, 1998) and 120 PI-children.

Since topic holds contain old information these instances were judged as relatively less relevant and as having a negative influence on the quality of the interview. In general, we suppose that with age the N- and PI-children will express more relevant information. We therefore expected that PI-children and younger N- and PI-children will produce more topic holds than N-children and older N- and PI-children, respectively. But, unexpectedly, although topic holds decrease over time in both N-children and PI-children, the differences were too small to observe a significant
linear age effect. We might expect that a decrease in topic holds slowly develops over the years beyond age eight/nine. We know, however, little about the amount of topic holds expressed by teenagers and adults in the conversational interview genre. Topic holds have different functions, such as the function of a thinking pause necessary to plan further information (1), an attempt to reorganise language information in a logical, causal manner within extended discourse (2), an instance of one of the most important persuasive strategies children have to learn (Van Eeemeren and Grootendorst, 1984) (3), and an attempt to get a new conversational topic introduced by repeating old information in a post-response-traject (Mazeland, 1992:226) (4). Only function (1) may influence the quality of the interview badly, whereas the other three functions just contribute towards functionality. We therefore propose that the function of topic holds should be further explored in the future. It might be only the function of topic holds that changes over time.

12.2.3 Conclusion: Topic Management
The results of the analysis of topic management are in line with previous results in this research in that in general the transmission of information in interviews with PI-children is less efficiently organized. The stimulating effort of the PI-interviewers with respect to topic management is comparable to the stimulating guidance discussed earlier, that is waiting longer for an answer to come (see 10.5.1) or giving more feedback and asking more pre-requests to activate a semantic field (see 11.1). Related to topic management, the PI-interviewers had to use the strategy of topic shading more frequently compared to the N-interviewer in order to elicit information that was new and relevant.

However, despite this extra support, the PI-children were not as good as the N-children in transmitting new and thus more relevant information. We showed that significantly more contributions of the PI-children concern old, redundant information and are only loosely linked to the ongoing conversational topic (see also Sperber and Wilson, 1986:46). There also exists a higher frequency of the strategy of topic shading by the PI-children compared to N-children. In sum, we state that most PI-children show difficulties in the management of conversational topics, especially in the ability to maintain a conversational topic, talking about a certain topic in more detail.

In the next section, we will explore the ability to link contributions coherently. This is a more detailed analysis of the ability to transmit relevant information than the analysis of topic management, although some coding categories may slightly overlap.
12.3 Introduction to Coherence

We already mentioned that linking contributions coherently means using implicit and explicit semantic connections between and within communicative contributions (see 12.1). For the analysis of coherence, the model designed for Dutch by Roelofs (1998) is used, based in turn on the model developed for English (Bishop and Adams, 1989). According to the Dutch model, contributions can be identified as 'coherently' or 'incoherently' linked to the ongoing conversation reflecting children's (dis)ability to follow the Maxims of Grice (1975). Communicative contributions that are not clearly linked in content to the previous contributions and contain, for example, redundant, ambiguous or too little/much information can be judged as incoherently linked to the ongoing conversation (Table 12.3).

We will explore whether PI-children are as good as N-children in the ability to link communicative contributions coherently. And, is there comparable development with age? In general, N-children actively try to make a coherent whole of their message content and form like adults tend to do (e.g. Gernsbacher and Givón, 1995; Sperber and Wilson, 1986). Younger N- and PI-children and PI-children as a group are expected to have more difficulties in this respect than N-children. The PI-children may not only be less co-operative, i.e. motivated to aim for relevancy, but also may be less able to organize information into a coherent whole (e.g. Van Berckelaer-Onnes, 2002; see 2.3.1). Not only their morphological/syntactic difficulties may play a part (see 4.2), but also social-cognitive difficulties. The ability to link sentences coherently makes a great demand on the social-cognitive capacities of children since they have to take into account the listener's point of view and world knowledge, both of which are part of the development of a Theory-of-Mind (Perner, 1991; Wellman, 1992) (see 2.3.3).

Roelofs (1998:123) suggests that some violations can have a greater negative semantic-pragmatic impact than others, related to the idea that with age the most severe violations will decrease more rapidly than the less severe violations. The violations of the Maxims are therefore ordered from relatively more severe to less severe (1 to 5) (see also Grice, 1975; Leech, 1983; Sperber and Wilson, 1986; Levinson, 1987; Mazeland, 1992).

The more severe the violations, the more the co-operative principle is ignored or also violated. For instance, violations of the Maxim of Relation (1) and Relevance (2) both signal an incoherency between the child’s reaction and the interviewer’s initiative. Violation of the Maxim of Relation (1) also suggests that even the co-operative principle is violated, because the child pays no attention to what the interviewer says and therefore the child’s contribution is not a real response to the interviewer’s initiative. These violations (1) are therefore judged as more severe than violations of the Maxim of Relevance (2) where the child takes into account what the interviewer says but gives a semantically/pragmatically inappropriate response. Therefore violations of the Maxim of relation (1) are presented at first position in the proposed hierarchy.
The ability to transmit relevant information frequently results in a contribution that is not clear at all or only partly understandable. Expressing too much information is giving redundant information, but the message mostly is clear: in Table 12.3 (3) is therefore presented higher in the ordering than (4).

However, the hierarchy proposed by Roelofs (1998) is debatable. For instance, giving false, ambiguous information seems to be worse and mirrors less cooperative behaviour than giving too much, but true information (4). Moreover, the relative frequency of violations also might be of influence on their overall semantic/pragmatic effect. For example, an extreme number of violations of the Maxim of Quantity may have a greater negative effect on the communication in general than a few instances of all violations, even if these violations were ordered higher in the hierarchy.

<table>
<thead>
<tr>
<th>Maxims of Grice</th>
<th>Categories of incoherence (Roelofs, 1998)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maxim of Relation</td>
<td>1. Violations of the Maxim of Relation</td>
</tr>
<tr>
<td>Be relevant</td>
<td>- unmarked topic shift</td>
</tr>
<tr>
<td>- ignoring initiation</td>
<td></td>
</tr>
<tr>
<td>2. Violations of the Maxim of Relevance</td>
<td>- different content connection</td>
</tr>
<tr>
<td>- different intention connection</td>
<td></td>
</tr>
<tr>
<td>- contextual yes/no implication</td>
<td></td>
</tr>
<tr>
<td>Maxim of Quantity</td>
<td>3. too little information:</td>
</tr>
<tr>
<td>Make your contributions as informative as required</td>
<td>- gap</td>
</tr>
<tr>
<td>Do not make your contributions more informative than is required</td>
<td>- jump</td>
</tr>
<tr>
<td>4. too much information:</td>
<td>- repetition</td>
</tr>
<tr>
<td>- reiteration</td>
<td></td>
</tr>
<tr>
<td>- elaboration</td>
<td></td>
</tr>
<tr>
<td>Maxim of Quality</td>
<td>5. Violations of the Maxim of Manner/ Quality</td>
</tr>
<tr>
<td>Do not say what you believe is false/ do not say that for which you lack adequate evidence</td>
<td>- ambiguous or false information</td>
</tr>
<tr>
<td>Maxim of Manner</td>
<td>Avoid obscurity of expression/ avoid ambiguity/ be brief/ be orderly</td>
</tr>
</tbody>
</table>

Although the model of incoherency has no one-to-one mapping to the original Maxims proposed by Grice (1975), it proved to be quite attractive and highly applicable for the identification of the amount of different types of incoherencies, reflecting semantic-pragmatic disorder. The Dutch model, for instance, differentiates
more precisely between different types of pragmatically inappropriate responses, first proposed by Bishop and Adams (1989). The different violations reflect the coding categories of the analysis of the ability to be coherent. Each category will be defined in the following sections in more detail.

12.4 Violations of the Maxim of Relation

12.4.1 Research questions, definitions and operationalisations

When a contribution has no direct connection with the ongoing communicative contribution(s), the Maxim of Relation is violated (Table 12.4). The child talks about something completely different than the interviewer at that moment in conversation. This is even a violation of the cooperative principle, coded as unmarked topic shift or ignored initiation.

An unmarked topic shift was coded when the child suddenly introduces a new conversational topic, ignoring the ongoing conversational topic\(^{14}\) (Example 8).

**Example 8**

Unmarked topic shift: violation of the Maxim of Relation (PI-child; age 6;2)

| Interviewer: | vind je het leuk om in de tuin te werken? (do you like to work in the garden) |
| Carina:       | knikt. (nods) |
| Carina:→      | en de slager kun je ook tegen zeggen barbecue. (and the butcher can you say barbecue) |
| Paraphrasing: | and to the butcher one can say: "we have a barbecue". |

In Example 8, the PI-child associatively might have linked the notions 'garden' with 'barbecue' and 'butchers'. Unmarked topic shifts can be observed frequently in N-children younger than four years of age and in (older) LI-children (e.g. Bishop and Adams, 1989; McTear and Conti-Ramsden, 1992; Sahlén and Nettelbladt, 1993).

Ignored initiation was coded when the child ignores the initiative of the interviewer (Example 9).

**Example 9**

Ignored initiation: violation of the Maxim of Relation (PI-child; age 7;8)

| Interviewer: | en hoe oud is Lotje? (and how old is Lotje?) |
| Emiel:→       | wij gaan maandag naar de dierentuin (we will visit the zoo on Monday) |

Beside these type of violations that signal pragmatic problems, children may also have problems with the uptake\(^{15}\) of verbal information or in taking someone else's point-of-view. Then, children express their own associations that are triggered by a

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\(^{14}\) This category partly overlaps with the category topic introduction (see 12.1).

\(^{15}\) See for the difference between language input, uptake and intake Van den Bogaerde (2000:7).
The ability to transmit relevant information

question, but they do not check if what comes to mind is relevant in relation to what is asked for.

12.4.2 Results: Violations of the Maxim of Relation

Figure 12.5 shows that the PI-children make significantly\(^{16}\) more unmarked topic shifts than the N-children, violating the Maxim of Relation.

We see that the four- and five-year-olds in both groups produce the most unmarked topic shifts, whereas the eight-year-old N-children produce hardly any. The PI-children lag behind in their semantic/pragmatic development, as the amount of unmarked topic-shifts in eight- and nine-year-old PI-children is more or less comparable to the amount in six-year-old N-children. With age the percentage unmarked topic shifts significantly\(^{17}\) decreases in both N-children (Roelofs, 1998:127) and PI-children. In order to make topic continuations in the conversational interview genre, one of the necessary conditions is to be focussed on the topics of the interviewer. Although we did not find that the ability to continue a conversational topic develops linearly with age in the PI-children, as opposed to the N-children (12.2), we observe that the PI-children become more sensitive to the topics expressed by the interviewers with age, although at a slower rate than the N-children.

\(^{16}\) ANCOVA with the number of 'communicative contributions coded for topic' as covariate; group effect: \((F(1,164)=7.73, p=0.006)\); age effect \((F(4,164)=17.96, p=0.001)\); no age*group interaction effect was observed (nine-year-old PI-children excluded).

\(^{17}\) ANCOVA (Polynomial contrast) with the same covariate; N-children \((F(5,69)=6.33, p=0.001)\); Linearity \(p=0.0001)\); PI-children \((F(5,113)=15.13, p=0.001)\); \(p=0.0001)\) (nine-year-old PI-children included).
Figure 12.6 shows that PI-children ignore an initiative of the interviewer significantly more frequently than the N-children, also violating the Maxim of Relation. When we look at the percentage ignored initiations, we see that not only the five- and six-year-old PI-children, but also the eight- and nine-year-old PI-children show comparable behaviour. Therefore, post hoc trend analysis showed only a linear decrease with age in the N-children (Roelofs, 1998:127), not in the PI-children. The eight-year-old N-children no longer ignore initiations expressed by the N-interviewer at all.

12.4.3 Conclusion: Violations of the Maxim of Relation

We showed that the PI-children significantly more frequently produced unmarked topic shifts and ignored the interviewer's initiations than the N-children. Although the amount of ignored initiations was relatively lower than the amount of unmarked topic shifts, each violation has a clear negative impact on the ongoing conversation. Both violations signal severe semantic/pragmatic difficulties in the interview genre and reflect non-co-operative language behaviour. These results are similar to earlier findings that indicate a higher proportion of pragmatically inappropriate responses in English-speaking pragmatic LI-children than in same-aged N-children (Bishop et al., 2000).

When we look at development with age, we observed that the PI-children lag behind in comparison to the N-children. The N-children develop a growing role-awareness and eight-year-old N-children violate neither types anymore. However, the PI-

18 ANCOVA with the number of communicative contributions coded on topic as covariate; group effect (F(1,164)=9.14, p<0.003); age effect: F(4,164)=3.50, p<0.009); no age*group interaction effect was observed.
19 ANCOVA (Polynomial contrast) with the same covariate. N-children: (F(4,69)=7.34, p<0.001, Linearity p<0.0001).
children show a language delay of approximately three to two years with respect to these two semantic/pragmatic language abilities. According to the hierarchy pointed out above (Roelofs, 1998), it is predicted that unmarked topic shifts decrease with age more quickly than the relatively less severe ignored initiations. This proved indeed to be the case in the N-children, especially in the younger age groups. This developmental tendency was also observed in the PI-children, although at all ages they make more violations of the Maxim of Relation of both types than the N-children.

12.5 Violations of the Maxim of Relevance

12.5.1 Research questions, definitions and operationalisations

When the content of the child's reaction is only partly connected to the content of the initiative of the interviewer, three different semantic/pragmatic connections have to be checked: different content connection, different intention connection and contextual yes/no implication. This part of the analysis deals with the quality of responses to information-soliciting contributions, that is to what extent do the answers match the expectations set up by the questions (Bishop et al., 2000). In this respect, this section is closely related to those sections from Chapter 11 that are concerned with the analysis of difficulties in being responsive (see 11.2 to 11.4). We might expect some problems in the PI-children in this respect. In general, (S)LI-children are observed to have a lower rate of semantically/pragmatically adequate responses than younger and MLU-matched N-children (Bishop et al., 1987; Rosinski-McClendon and Newhoff, 1987); this seems especially the case in pragmatical LI-children (Bishop et al., 2000).

First, the answer of the child is not necessarily an answer to the question asked by the interviewer: the content of the answer can be about another question, other people, objects, etc. than asked about. In such cases the first communicative contribution of the response expressed by the child is coded as different content connection (Example 10). This type of violation may be caused by the child's inability to fully comprehend the question.

Example 10  Different content connection: violation Maxim of Relevance (PI-child, age 8.1)

Interviewer: en in welke plaats woon jij? (and in which town do you live?)
<suprehoe> [streetname unclear] thirty-seven

In Example 10, the child answers as if asked 'and what is the name of the street and your house number?'.

Second, the answer is not what the interviewer wants, because the content of the answer is too specific (Van Dijk, 1977) or too general (Smith and Leinonen, 1992), or about another aspect than asked for. This violation is mostly caused by the child's
inability to interpret the implicit information that had to be inferred from what was explicitly asked for the interviewer. These instances were coded as different intention connections (Example 11).

**Example 11**  Different intention connection: violation of Maxim of Relevance (PI-child; age 4,6)

|-------------|--------------------------|--------|-----|

In Example 11, the PI-child answers as if was asked 'how is it going?' instead of 'what happens there?'. An appropriate answer would have been: when I arrive there, I first put on my bikini, then I ..... and so on. The PI-child wrongly interprets the question, because in Dutch there is only a very small difference between the question 'and what happens there? (hoe gaat dat?)' and 'how is it going? (hoe gaat het?)', although the intonation differs between the two: 'hoe gaat dat?' respectively 'hoe gaat het?'

Even up to six/seven years of age N-children seem to make no clear distinction between actual message meaning and speaker's intended meaning (Frye and Moore, 1991). Bishop and colleagues (2000) observed that pragmatic LI-children (LI—children with mainly pragmatic language impairment) had a relatively high level of pragmatically inappropriate responses that were not readily accounted for in terms of limited morphosyntax or vocabulary. Many of these over-literal responses reflected difficulties in responding to (indirect) communicative intents.

Third, a contextual yes/no implication is coded when in the reaction of the child the yes/no answer is not explicitly expressed, because it can be inferred from the answer given. The child shows to ability to reduce redundancy. This ability is therefore judged as semantically/pragmatically appropriate behaviour. The answer in which the yes/no content is incorporated is mostly a coherent, relevant reaction to the question asked (Example 12).

**Example 12**  Contextual yes/no implication (PI-child; age 9,1)

<table>
<thead>
<tr>
<th>Interviewer:</th>
<th>hebben jullie thuis huisdieren?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manilla:</td>
<td>alleen een parkiet</td>
</tr>
<tr>
<td>Paraphrasing:</td>
<td>yes.</td>
</tr>
</tbody>
</table>

The first two subtypes different content connections or different intention connections are clear violations of the Maxim of Relevance, reflecting semantically/
The ability to transmit relevant information

pragmatically inappropriate behaviour. Contextual yes/no implications reflect sophisticated semantic/pragmatic behaviour.

12.5.2 Results: Violations of the Maxim of Relevance

Figure 12.7 shows that the PI-children produce significantly more different content connections than the N-children.

With age the amount of different content connection violations linearly decrease with age in both groups (Roelofs, 1998:128), although the N-children improve more quickly than the PI-children. The older PI-children, however, still make three times as many violations of this type compared to the older N-children.

A closer look at the data suggests that the younger PI-children have most problems with giving the answer asked for, mainly due to comprehension problems, comparable to the N-children. In the older age groups, eight- and nine-year-old PI-children and the seven- and eight-year-old N-children seem to reach a ceiling effect.

Figure 12.8 shows that different intention connection violations are more frequently found in the PI-children than in the N-children. The PI-children give significantly more responses that do not fit the intended meaning of the PI-interviewers’ question,

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20 ANCOVA with the number of communicative contributions coded on topic as covariate. group effect: (F(12.04, p<0.001); age effect F(4,164)=9.90, p<0.001); no age*group interaction effect was observed (nine-year-old PI-children excluded).

21 ANCOVA (Polynomial contrast) with the same covariate; N-children: F(4,69)=8.39, p<0.001, Linearity: p<0.0001; PI-children: F(5,113)=3.66, p<0.007, Linearity: p<0.0001 (nine-year-old PI-children included).

22 ANCOVA with the number of communicative contributions coded for topic as covariate. group effect: (F(1,164)=22.36, p<0.0001); an age effect was not observed; age*group interaction effect: F(4,164)=5.02, p<0.001 (nine-year-old PI-children excluded).
comparable to earlier reports found in English-speaking pragmatic LI-children (Bishop et al., 2000).

Although we see that the PI-children improve with age, especially from four to six years of age, no linear age effect is observed in the PI-children. The amount of different intention connection violations seems relatively more stable over time in the N-children (Roelofs, 1998:128), although they slightly improve with age. We clearly see that the nine-year-old PI-children in the end arrive at a more 'normal' level that is comparable to the eight-year-old N-children. The younger the PI-children, the more difficulties they have in computing what is semantically/pragmatically required from them.

Figure 12.8  The percentage different intention connections (calculated over the communicative contributions coded for topic) expressed by 75 N-children (Roelofs, 1998) and 120 PI-children

Looking more closely at the data, most of these violations are caused by the PI-children's problems with the interpretation of indirect questions (see 11.7), such as requests for acknowledgements and rather implicit questions, such as 'and then?' or 'what next?' whereby most of the specific information asked for has to be inferred from what is said prior to the question asked.

Figure 12.9 shows a totally different pattern from the two previous figures, since contextual yes/ no implications reflect semantically/ pragmatically appropriate behaviour.

23 ANCOVA (Polynomial contrast) with the same covariate: N-children: no significant age effect; PI-children: F(4,94)=4.00, p<0.005, Linearity: p<0.006 (nine-year-olds excluded). PI-children: F(5,113)= 3.90, p<0.003, Linearity: p<0.010 (nine-year-olds included).
It is clear that the percentage contextual yes/no implications in PI-children is more or less stable over time, whereas we see, as expected, an increase in the N-children, except in the six-year-olds. However, the differences proved to be too small to observe any significant main effects24 (see also Roelofs, 1998:126).

The fact that the four-year-old PI-children are doing so well is mainly caused by four four-year-old PI-children, who were asked relatively many simple yes/no questions. The fact that the six-year-old N-children leave relatively few yes/no answers implicit probably belongs to the developmental trend that N-children are very explicit in their reactions at age six (see also Roelofs, 1998:128).

A possible explanation for not finding any linear age effect is that more contextual yes/no implications can be found in the data than were actually coded as such, like reactions to an initiative of the interviewer in the declarative form (Example 13).

**Example 13**

*Contextual yes/no implication to a statement in the declarative form (PI-child: age 7;0)*

**Interviewer:**

jij vindt dinosaurussen wel leuk.
(you like dinosaurs).

**Bas:**

ik ben er stapelgek op.
(I am mad about them).

**Paraphrasis:**

yes.
I am mad about them

---

24 Using ANCOVA with the number of second pairparts expressed by the child as covariate (1) and yes/no-question expressed by the interviewer as covariate (highly significant) (2), no main effects are observed.
Furthermore, sometimes a contextual yes/no implication is not semantically/pragmatically adequate behaviour when an explicit yes/no answer would have made things more clear (Example 14).

**Example 14**

A semantic-pragmatic inadequate contextual yes/no implication  
(PI-child; age 4;10)

**Interviewer:**  
en komt ze weleens bij jou spelen?  
(and does she sometimes play with you at your home?)

**Rudy:**  
weet niet waar ik woon.  
(does not know where I live).

**Paraphrasis:**  
no,  
because she does not know where I live

Thus, coding more types of contextual yes/no implications and judging the semantic/pragmatic adequacy per case may give more insight into a possible development, and difficulties in the use of different types of yes/no implications.

**12.5.3 Conclusion: Violations of the Maxim of Relevance**

The PI-children produced different content and intention connections more frequently, violating the Maxim of Relevance significantly more than the N-children. Both violations have a negative impact on the ongoing conversation and reflect relatively severe semantic/pragmatic difficulties in the interview genre with the ability to be responsive (see also Chapter 11).

These violations with respect to different content and intention connections are less severe than violations of the Maxim of Relation (see 12.4): in case of different content/intention connections the co-operative principle is still followed, since the children are willing to give a suitable answer. The PI-children try to give a relevant reaction, but this is not or only partly semantically/pragmatically appropriate. Broadly speaking, the PI-children resemble the (S)LI-children and pragmatic LI-children in having a significantly lower rate of semantically/pragmatically adequate responses than N-children (Bishop et al., 1987; Rosinski-McClendon and Newhoff, 1987; Bishop et al., 2000).

When we look at development with age, we observe a significant linear decrease in the production of different content violations in both populations. However, the PI-children show a language delay of approximately one to two years, since older PI-children make as many different content violations as younger N-children do.

With respect to different intention violations we expected a similar developmental pattern. However, we only observed a decrease in four- to six-year-old PI-children, although the older PI-children still make more different intention violations than the N-children. The N-children showed – unexpectedly – no significant linear development over time at all; N-children still have difficulties in computing what is the intention in semantic/pragmatic terms of the interviewer. This result suggests that even N-children older than eight still have to improve their semantic/pragmatic ability to follow the Maxim of Relevance, whereas at that age they no longer violate the Maxim of Relation (see 12.4). This confirms the idea that with age the most severe violations (Maxim of Relation) will decrease more rapidly than the less
severe violations (Maxim of Relevance) (Roelofs, 1998:123). This developmental
tendency was also observed in the PI-children.
Since with respect to the amount of contextual yes/no implications no significant
main effects were found, the PI-children seem as good as the N-children in leaving
out redundant yes/no answers, although more detailed research is necessary in order
to include all yes/no implications and a judgement of their semantic/pragmatic
appropriateness.

12.6 Violations of the Maxim of Quantity: too little information

12.6.1 Research questions, definitions and operationalisations
Communicative contribution can contain too little information, because children
omit obligatory morphological/syntactic elements, coded as morphological/
syntactic errors (Chapter 5). When children leave out more than these obligatory
elements, wrongly supposing that the interviewer can infer the implicit information
on the basis of what is explicitly said, these instances are coded as violation of the
Maxim of Quantity: too little information and scored as semantic/pragmatic violation
of one of the Maxims.
Violations of the Maxim of Quantity: too little information are divided into gaps and
jumps. In order to detect these types of violations, we make use of paraphrases in
which the associative links made internally by the child are made explicit in order to
come to an understandable, coherent and thus relevant transmission of information.
A gap is scored when obligatory semantic/pragmatic information of at least one
clause or more remains unexpressed. A logical step is missing within extended dis­
course which would link the child's contribution to the previous ones (e.g. Bishop

Example 15  
Gap: violation of the Maxim of Quantity: too little information
(P1-child; age 7.5)

Interviewer:  
en heb jij dan geen vader?
(and don't you have a father?)
misssing link: no, I have got a father
Michael:
die is gescheiden
(his is divorced).
misssing link: but he is divorced from my mother and doesn't live not with us
missing link: she (my mother) did not want to live with him anymore.
Michael:  
iedere keer als ie een pilsje op, dan neemde ie de nog een
because every time he had a lager, he drank another one from early in the morning
till late in the evening)

Paraphrasing:  
want iedere keer als ie een pilsje op had, dan nam die er nog een

In Example 15 we made semantic/pragmatic paraphrases of missing links to make
the narrative complete. The successive missing links was scored as only one gap. In
Example 15 we scored two gaps in total.
A jump is scored when obligatory semantic/pragmatic information within one clause is not expressed, such as adverbs or non-obligatory arguments of the verb (see 5.3 and 5.4) (Example 16).

**Example 16**  
*Jump: violation of the Maxim of Quantity; too little information*  
*(PI-child; age 9:9)*

Esther:  
toen ik nog klein was, had ik een goudvis.  
(at the time I was little, I had a goldfish.)

Esther:  
maar die werd veelste groot.  
(but he became too big)

Paraphrasis:  
but he became too big for the bowl he was swimming in  
too big in relation to what?  
for the bowl (adverb of place)

In Example 16, the fish became too big ... for what?; essential information to understand the anecdote is missing.

A jump was also scored when obligatory semantic/pragmatic information of less than one clause is not clearly expressed. This occurs through the use of unclear adverbs, further referred to as light adverbs (there; then) (see 5.7 and 6.3 for other, morphological/syntactic errors in the use of adverbs) and unclear inanimate referents, further referred to as light inanimate referents (this; that). 'Light' means in this context semantically vague or semantically not opaque (Example 17).

**Example 17**  
*Jump: violation of the Maxim of Quantity; too little information; conversation topic is 'catching the guinea-pig' (PI-child; age 9:9)*

André:  
en dan komt tie zo naar mijn vader toe.  
(and than he comes so to my father)

Paraphrasis:  
en dan komt tie springend/snel naar mijn vader toe.  
(and than he comes hopping/quickly to my father)  
so→hopping/quickly (adverb of manner)

André:  
mijn vader kan hem niet vangen.  
(my father cannot catch him)

In Example 17, a light adverb of manner 'zo' (so) is used instead of a semantically more specific one. Although most of the message remains clear, and the sentence remains morphologically/ syntactically correct, precise information is necessary in order to coherently link the sentence to the next one. Both gaps and jumps are counted in each interview.

**12.6.2 Results: Violations of the Maxim of Quantity: too little information**

Figure 12.10 shows that in the PI-children, except for the five-year-olds, the percentage of gaps is significantly\(^{25}\) higher than in the N-children.

---

\(^{25}\) ANCOVA with the number of communicative contributions coded for topic as covariate; group effect (F(1,164)=5.29, p=0.023); age effect (F(4,164)=10.22, p=0.0001); no age\*group interaction effect was observed (nine-year-old PI-children excluded).
The ability to transmit relevant information

Figure 12.10 The percentage gaps (calculated over all communicative contributions coded for topic) expressed by 75 normally developing children (Roelofs, 1998) and 120 PI-children.

Post hoc trend analysis shows that in the N-children the percentage gaps decreases linearly\(^{26}\) with age. Thus, with age fewer propositions are missing in the N-children (see also Roelofs, 1998:128). A linear decrease is not found in the PI-population, although we see a decrease with age if we exclude the five-year-old PI-children. We cannot explain why they do relatively better.

The PI-children have more difficulties in making the right presuppositions of what can be left unsaid: they leave too much implicit, frequently violating the Maxim of Quantity. The PI-children have difficulties in being explicit not only on the level of semantic/pragmatic information transmission, but also on the level of morphological/syntactic information transmission (see Chapter 5).

In case of a jump the missed or unclear information is within one clause (Figure 12.11). When we compare Figures 12.10 and 12.11 we see that jumps are more numerous than gaps in both N- and PI-children. Unexpectedly, no significant group effect\(^{27}\) is observed. In the N-children the percentage jumps linearly decreases with age (see also Roelofs, 1998:128). A linear decrease of jumps\(^{28}\) is only found in the PI-children upto eight years.

---

\(^{26}\) ANCOVA (Polynomial contrast) with the same covariate. N-children(\(F(4,69)=8.44, p<0.001\); Linearity: \(p<0.0001\)).

\(^{27}\) ANCOVA with the number of communicative contributions coded for topic as covariate; age effect: \(F(4,164)= 13.61, p<0.0001\); no age*group interaction effect was found (nine-year-old PI-children excluded).

\(^{28}\) ANCOVA (Polynomial contrast): N-children: age effect \(F(4,69)=9.77, p<0.0001\); Linearity: \(p<0.0001\); PI-children: age effect (nine-year-olds excluded): \(F(4,94)=4.52, p<0.002\); Linearity: \(p<0.0001\); PI-children (nine-year-old PI-children included): \(F(5,113)=3.48, p<0.006\); Linearity: \(p<0.007\).
12.6.3 Conclusion: Violations of Maxim of Quantity: too little information
The older N-children describe events more clearly than the younger N-children (Roelofs, 1998:129). This is not the case in the PI-children: they make significantly more gaps at all ages. Further research must be done to differentiate types of gaps and jumps that cause these violations of the Maxim of Quantity. Since all missing morphological/syntactic obligatory elements could have been counted as semantic/pragmatic jumps as well, the operationalisation procedure in order to differentiate these problems in both language areas needs further investigation.

12.7 Violations of the Maxim of Quantity: too much information

12.7.1 Research questions, definitions and operationalisations
Information was judged as too much information, and therefore as redundant/less relevant, when the information was already known to the interviewer because the child already mentioned it. Following Roelofs (1996), we coded an elaboration when the redundant information is in more than one clause, a reiteration when the redundant information is one clause and a repetition in case the redundant information concerns less than one clause.

Some of these types of irrelevant contributions, such as excessive elaborations, have been used in previous research (Rapin and Allen, 1983; Bishop and Rosenbloom, 1987; Bishop and Adams, 1989), since these types of incoherencies frequently were observed in LI-children with semantic-pragmatic disorder (see also Sahlén and Nettelbladt, 1993) (see 10.1). In PI-children on the autistic spectrum similar LI-symptoms have been reported (see Bishop and Rosenbloom, 1987; Wing, 1988).

An elaboration was scored if the child already provided the information requested by the interviewer (Example 18).
The ability to transmit relevant information

Example 18  
Elaboration (PI-child; age 6;5)

Interviewer:  
dus jij bent nu # hoeveel jaar?  
(thus how old are you # now?)

Alexander:  
zes.  
(six)

Alexander:  
en dan word ik zeven.  
(and then I will be seven)

Alexander:  
en dan word ik acht.  
(and then I will be eight)

In Example 18, the last two contributions are redundant, since the information can be inferred from the first contribution.

A reiteration was scored if a clause was repeated (Example 19).

Example 19  
Reiteration (PI-child; age 7;1)

Interviewer:  
en wat doe je dan aan dat bureau?  
(and what do you do at your writing-table?)

Paraprasis gap:

Emiel:  
on mijn writing table I have got many writing-papers.  
(on one I scratch very hard, that it is all dirty)

Emiel:  

In Example 19, one clause was repeated and scored as a violation of the Maxim of Quantity: too much information. Also too little information is given: where does 'een' (one) refers to? The added paraphrasis 'on my writing table I have got many writing-papers', was additionally scored as a gap (see 12.6). Thus, more than one violation can be found in the same part of the interview. Reiterations of a clause expressed by the N- and PI-interviewers was not judged as echolalia, although echolalia is reported to exist in severely disordered LI-children with semantic-pragmatic disorder (Rapin and Allen, 1983; Bishop and Rosenbloom, 1987; Sahlen and Nettelbladt, 1993) and PI-children on the autistic spectrum (e.g. Rogers-Adkinson, 1999).

A repetition was scored if a previous word/words or a phrase/phrases was repeated. This may be the case if children make no use of ellipsis when an elliptical form was expected (e.g. Bishop and Adams, 1989) (see 8.3 and 13.2), or if they made no use of conjunction reduction constructions (see 8.4) (Example 20), or repeated previously mentioned adverbs. If the repeated information was a non-fluent phonological, lexical or structural repetition and/or revision (called 'mazes' by Fletcher, Garman, Johnson, Schelleter and Stodel (1986)) these were not coded as repetitions.

Example 20  
Repetition (PI-child; age 7;8)

Interviewer:  
en toen?  
(and then?)

Daniella:  
toen zei ik hele lelijke woorden in mijn eigen tegen papa en tegen mama

en tegen mama

In Example 20, the preposition 'tegen' (to) is redundant and should have been elicited. This is then scored as a violation of the Maxim of Quantity: too much information.

12.7.2 Results: Violations of the Maxim of Quantity: too much information

From Figure 12.12 we see that the PI-children unexpectedly produce significantly fewer elaborations than the N-children\(^{29}\), although the percentages are quite small in general. No linear age effects are found in either group\(^{30}\).

**Figure 12.12** The percentage elaborations (calculated over all communicative contributions coded for topic) expressed by 75 N-children (Roelofs, 1998) and 120 PI-children

From Figure 12.13 we see that the PI-children produce significantly\(^{31}\) more reiterations than the N-children. With age the percentage reiterations linearly decreases\(^{32}\) in both N-children (Roelofs, 1998: 129) and PI-children.

We checked whether a substantial part of reiterations could be judged as echolalia, i.e. imitating the PI-interviewers. This proved not to be the case, since PI-children expressed more reiterations of their own previous contributions.

---

\(^{29}\) ANCOVA with the number of communicative contributions coded for topic as covariate; group effect: \(F(1,164)=13.29, p<0.0001\); age effect: \(F(4,164)=3.11, p<0.017\); no age*group interaction effect was found (nine-year-old PI-children excluded).

\(^{30}\) ANCOVA (Polynomial contrast) with the same covariate.

\(^{31}\) ANCOVA with the number of communicative contributions coded for topic as covariate; group effect: \(F(1,164)=23.94, p<0.0001\); age effect: \(F(4,164)=8.39, p<0.0001\); no age*group interaction effect was found (nine-year-old PI-children excluded).

\(^{32}\) ANCOVA (Polynomial contrast): N-children: age effect \(F(4,69)=6.52, p<0.0001\); Linearity: \(p<0.0001\); PI-children: age effect (nine-year-old PI-children included): \(F(5,113)=4.62, p<0.001\); Linearity: \(p=0.0001\).
The ability to transmit relevant information

Figure 12.13  The percentage reiterations (calculated over all communicative contributions coded for topic) expressed by 75 N-children (Roelofs, 1998) and 120 PI-children

![Graph showing the percentage reiterations for N-children and PI-children over ages 4 to 9 years.]

From Figure 12.13 we see that the PI-children repeat significantly fewer words/word groups than the N-children. Although we see that with age the repetitions produced by the N-children decrease from age five to eight, for the whole group of N-children no linear age effect was found, nor was there a decrease with age in the PI-children.

Figure 12.14  The percentage repetitions over all communicative contributions coded for topic expressed by 75 N-children (Roelofs, 1998) and 120 PI-children

![Graph showing the percentage repetitions for N-children and PI-children over ages 4 to 9 years.]

33 ANCOVA with the number of communicative contributions coded for topic as covariate; group effect: (F(1,164)= 24.16, p<0.001); no age- or age*group interaction effect was found (nine-year-old PI-children excluded).

34 ANCOVA (Polynomial contrast) with the same covariate.
That the PI-children produced fewer repetitions compared to N-children fits into their overall tendency to be rather implicit with respect to the information transmission within communicative contributions. Whereas N-children are frequently too clear, the PI-children are not, as they often produce contributions that are not complete, correct and intelligible at all.

12.7.3 Conclusion: Violations of the Maxim of Quantity: too much information
The PI-children produced significantly fewer elaborations (more than one clause), more reiterations (one clause) and fewer repetitions (within a clause) than the N-children. At first glance these results seem contradictory. However, these result all point to the same underlying semantic/pragmatic disability in producing new, relevant information.

The N-children produce more elaborations and tend to be too clear. This way they increase the chance that they say new things that are predictable on the basis of what has been said before. Many PI-children on the other hand keep the output frequently as minimal as possible (see 10. 5 and 11.7), reducing the chance to make elaborations. This result is unlike earlier reports that signalled many instances of elaborations in LI-children (Rapin and Allen, 1983; Bishop and Rosenbloom, 1987; Sahlén and Nettelbladt, 1993; Bishop and Adams, 1989) and in PI-children (Bishop and Rosenbloom, 1987; Wing, 1988).

Although most instances could not be judged as echolalia, the PI-children produced more reiterations than the N-children. This is in line with previous results (Adams and Bishop, 1989) and is related to the remarkably high proportion of topic holds (see 12.1). The PI-children may use reiterations as floor-holding strategy. An underlying information processing problem on the memory level (see 2.3.1) might also cause PI-children to 'forget' what they just expressed, when more than one clause has to be remembered. They therefore repeat what has just been expressed, unable to differentiate between old and new information.

The PI-children produce fewer repetitions within a clause than the N-children. On a local level, memory problems might be less obvious. The most plausible explanation is that the PI-children show low morphosyntactic complexity (see 8.4 to 8.6), more short turns (see 10.4), and produce less new information (see 12.1), reducing the chance of giving too much information on a local level.

12.8 Violations of the Maxim of Manner/Quality

12.8.1 Research questions, definitions and operationalisations
The Maxim of Quality is violated when ambiguous information is expressed. This violation was scored when children gave information that was in contrast with earlier information or when children gave false information (e.g. a lie; a fantasy), mainly due to a lack of world knowledge or a wrong presupposition (e.g. Bishop and Adams, 1989). Contributions to a conversation should not be knowingly false or lack adequate evidence. Young N- and PI-children, however, whose powers of
reasoning and of discriminating between fact and fantasy are yet immature, may have difficulties in following this Maxim (Example 21).

**Example 21**  
Violation of the Maxim of Manner/Quality: ambiguous information (PI-child; age 8;2)

Interviewer: wat vind jij grappig aan een dolfijn?  
(what do you think is funny about a dolphin?)

Child: dat ze mij zo leuk vinden.  
(that they like me so much).

In Example 21, the PI-child wrongly – although very creatively – presupposes that all dolphins like her.

In some cases this type of violation was scored when the information was not only not true, but also socially inappropriate (Example 22).

**Example 22**  
Violation of the Maxim of Manner/Quality: ambiguous and socially inappropriate information (PI-child; age 7;8)

Interviewer: wat doe je op straat?  
(what are you doing on the street?)

Emiel: ↳ <eh> krijten en poepen op de straat, en scheten en reten en poepies.  
(<eh> chalking and shitting on the street, and winding and arses and shits).

In Example 22, the PI-child expresses that he frequently shits on the street, and so on, which is not impossible, but hopefully not true. This last type of violation could has been scored separately by Bishop and Adams (1989).

12.8.2 Results: Violations of the Maxim of Manner/Quality  
From Figure 12.5 we see that the PI-children more frequently violate the Maxim of Manner/Quality by giving significantly\(^{35}\) more ambiguous information than the N-children. With age a linear decrease is found in both N-children (see also Roelofs, 1998:129-130) and PI-children.

---

\(^{35}\) ANCOVA with the number of communicative contributions coded for topic as covariate; group effect: \(F(1,164)=34.93, p<0.0001\); age effect \(F(4,164)=6.55, p<0.0001\); no group\(\ast\)age interaction effect was found. (nine-year-old PI-children excluded).
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12.8.3 Conclusion: Violations of the Maxim of Manner/Quality

The PI-children clearly have difficulties in following the Maxim of Manner/Quality, as they give significantly more ambiguous and contradictory information than the N-children. When contradictory information is given, the PI-children may not remember what they said just before, do not know what to believe is true or do not remember what happened exactly in the experiences they describe. When untrue information was given as if it were the truth, PI-children frequently described some fantasy, such as 'I can walk on the wall', as if it was real to them. In PI-children the ability to separate real experiences from fantasy may be more problematic than in the N-children and normally developing children in general.

12.9 General conclusions: the ability to transmit relevant information

The results of the analysis of topic management and coherence are in line with previous results that show that in general the transmission of information in interviews with PI-children is less efficiently organized. The PI-interviewers' stimulating effort by using the strategy of topic shading with respect to topic management is comparable to the stimulating guidance mentioned earlier. That is making longer pauses, giving more feedback and asking more pre-requests in order to (pre)activate a semantic field. However, despite this extra support, the PI-children show disabilities in the management of conversational topics, especially in the ability to maintain a conversational topic, talking about a certain topic and expressing more new, relevant details.

We know from Roelofs (1998:121) that N-children in this age range are expected to make relatively many violations. The N-children do not yet have an adult competence, and have not acquired those Theory-of-Mind skills necessary to take
The ability to transmit relevant information into account the listener's point-of-view and knowledge of the world. For instance, children have to learn that they have to be explicit about the place and time of a certain event (Hickmann, 2003). The ability to link sentences coherently is one of the major developments during the school years and in the age range studied (e.g. Bishop and Adams, 1989; Roelofs, 1998).

With respect to coherence, we give an overview of the violations of the different Maxims in Table 12.4. There the contextual yes/no implications are omitted since these are not violations of the Maxim of Relevance (Figures 12.5 - 12.15, except for Figure 12.9). When we look at all violations that can be made within one interview calculated over all communicative contributions, we see that within the age range studied the N-children have relatively fewer violations (mean 45%) of a certain Maxim, whereas the PI-children have far more (mean 56%) in the conversational interview genre (see also Roelofs, 1998:126). All differences were significant for each Maxim, except for the amount of jumps, calculated over all communicative contributions coded for topic.

Table 12.4 Mean total percentages of violations of the different Maxims (calculated over all communicative contributions coded for topic) in the N-children and PI-children (4;0 to 8;1 years)

<table>
<thead>
<tr>
<th>Violations of the Maxims</th>
<th>N-children n=75</th>
<th>PI-children n=100</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Violations of the Maxim of Relation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>unmarked topic shift</td>
<td>3 %</td>
<td>7 %</td>
</tr>
<tr>
<td>ignoring initiation</td>
<td>1 %</td>
<td>2 %</td>
</tr>
<tr>
<td>2. Violations of the Maxim of Relevance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>different content</td>
<td>6 %</td>
<td>9 %</td>
</tr>
<tr>
<td>different intention</td>
<td>3 %</td>
<td>4 %</td>
</tr>
<tr>
<td>3. Violations of the Maxim of Quantity: too little information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gap</td>
<td>21 %</td>
<td>22 %</td>
</tr>
<tr>
<td>jump</td>
<td>6 %</td>
<td>7 %</td>
</tr>
<tr>
<td>15 %</td>
<td>15 %</td>
<td></td>
</tr>
<tr>
<td>4. Violations of the Maxim of Quantity: too much information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>elaboration</td>
<td>14 %</td>
<td>12 %</td>
</tr>
<tr>
<td>reiteration</td>
<td>4 %</td>
<td>3 %</td>
</tr>
<tr>
<td>repetition</td>
<td>4 %</td>
<td>6 %</td>
</tr>
<tr>
<td>6 %</td>
<td>3 %</td>
<td></td>
</tr>
<tr>
<td>5. Violations of the Maxim of Manner/Quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ambiguous/ false information</td>
<td>2 %</td>
<td>5 %</td>
</tr>
<tr>
<td>Total violations</td>
<td>46 %</td>
<td>56 %</td>
</tr>
</tbody>
</table>
The higher frequency of violations of the Maxim of Relation and Relevance found in the PI-children as compared to the N-children show the PI-children's difficulties in giving coherent, relevant responses. A coherent, relevant response must contain coherently connected new information. These results confirm the earlier findings related to responsiveness that signalled a relatively higher amount of minimal responses produced by the PI-children (see 11.7). The PI-children more frequently produced unmarked topic shift or ignored initiation of the interviewer. The topic under discussion expressed by the PI-interviewers frequently was totally ignored by the PI-children.

The relatively high frequency of violations of the Maxim of Relevance shows that the PI-children also relatively more frequently gave answers that differ from the content or the pragmatic intention expressed by the interviewer, and thus are not coherently linked. The topic under discussion expressed by the PI-interviewers was not, or only partly understood, by the PI-children, or they had difficulties in computing the pragmatic intention of implicitly formulated requests.

The other types of violations are not only related to responsiveness, but give an indication about linking successive contributions coherently in extended discourse (see 11.5). Although the PI-children produced a comparable amount of extended discourse with a narrative character as the N-children, the PI-children proved to have severe difficulties in linking these narrative contributions coherently. They frequently gave not enough explicit information or false/contradictory information that sometimes even was socially unacceptable, when they used swear words or taboo words.

Coming back to the proposed hierarchy of Maxims (see 12.2), we showed that violations of the Maxim of Manner/Quality, when a child gives ambiguous/false information (5) is more semantically/pragmatically marked than when a child gives too much, but clear information (4). It was also suggested that with age the most severe violations will decrease more rapidly than the less severe violations (Roelofs, 1998). With age respectively the Maxims of Relation (1), Relevance (2) and Manner/Quality (5) decrease at a higher rate than the Maxim of Quantity (3/4) in both populations. This finding confirms that violations of the Maxim of Manner/Quality are more severe than violations of the Maxim of Quantity.

We computed the percentage of all types of violations over all communicative contributions coded for topic. This includes the 50-T-units and the elliptical answers that together form most of the children's speaking time (Figure 12.16). First, the PI-children violate the Maxims significantly more than the N-children. With age the percentage violations linearly decreases in the N-children and PI-children only if we exclude the nine-year-old PI-children; no difference in performance between the

36 ANCOVA with the number of communicative contributions coded for topic as covariate; group effect: F(1,164)=32.00, p<0.0001; Age effect F(4,164)=49.40, p<0.0001. No age*group interaction effect is observed (nine-year-old PI-children excluded).

37 ANCOVA (Polynomial contrast) with the same covariate: N-children: F(4,69)=33.77, p<0.0001; Linearity p<0.0001; PI-children (nine-year-olds excluded) F(4,94)=29.94, p<0.0001; Linearity p<0.0001; PI-children (nine-year-old included F(5,113)=26.88, p<0.0001; Linearity p<0.0001.
The ability to transmit relevant information

The ability to transmit relevant information

eight- and nine-year-old PI-children is found. With age children in both groups become more able to avoid incoherencies and irrelevant information transmission. With age the communicative contributions are more correctly coherently connected to the contributions of the interviewer and to contributions previously mentioned by the child, fitting more appropriately into the ongoing conversational topic. This measure may be a very good marker for semantic-pragmatic difficulties.

Figure 12.16 The mean total percentage of all violations (calculated over all communicative contributions coded for topic) expressed by 75 N-children (Roelofs, 1998) and 120 PI-children

In sum, although in general school-aged N-children still make relatively many violations compared to adults, the PI-children have significantly more semantic/pragmatic difficulties in the ability to transmit relevant information than the N-children. The PI-children frequently show insufficient management of the conversational topic and violate the different Maxims significantly more frequently, reflecting difficulties to link contributions coherently.
The ability to transmit relevant information: use of cohesive devices

Claudia Blankenstijn

13.1 Introduction

We have already mentioned that the correct use of cohesive devices plays a part in the semantic connections within and between communicative contributions (see 12.1). With the correct use of cohesive devices linguistic messages can become clearer, more transparent, and thus easier to interpret; all of which are prerequisites for a message to be relevant. For the analysis of cohesion (part of) the typology designed by Halliday and Hasan (1976) has been used to investigate different kinds of cohesive devices that children use, following Roelofs (1996). The analysis here is restricted to ellipsis, conjunctions/subjunctions and co-referential cohesion, following Roelofs (1998) (Table 13.1).

<table>
<thead>
<tr>
<th>Main types</th>
<th>Classification</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ellipsis</td>
<td>nominal ellipsis (NP)</td>
<td>you have two cats. I have only one Θ</td>
</tr>
<tr>
<td></td>
<td>verbal ellipsis (VP)</td>
<td>you drink milk and I Θ coffee. do you have pets? Yes, Θ two dogs.</td>
</tr>
<tr>
<td></td>
<td>clausal ellipsis (VP+NP)</td>
<td></td>
</tr>
<tr>
<td>Conjunctions</td>
<td>additive conjunction</td>
<td>and/or</td>
</tr>
<tr>
<td></td>
<td>adversative conjunction</td>
<td>but</td>
</tr>
<tr>
<td></td>
<td>causal conjunction</td>
<td>because/thus</td>
</tr>
<tr>
<td></td>
<td>temporal conjunction</td>
<td>then/now</td>
</tr>
<tr>
<td></td>
<td>continuative conjunction</td>
<td>well</td>
</tr>
<tr>
<td>Lexical cohesion</td>
<td>synonymy</td>
<td>cat - pussy</td>
</tr>
<tr>
<td></td>
<td>repetition</td>
<td>cat - cat</td>
</tr>
<tr>
<td></td>
<td>co-occurrence</td>
<td>siblings: brother - sister; they</td>
</tr>
<tr>
<td></td>
<td>contrast</td>
<td>wet - dry</td>
</tr>
<tr>
<td></td>
<td>substitution</td>
<td>I have a cat, a real monster</td>
</tr>
<tr>
<td>Co-reference</td>
<td>pronominal reference</td>
<td>the boy walks. he stumbles.</td>
</tr>
<tr>
<td></td>
<td>demonstrative reference</td>
<td>I have a dog. that loves cats.</td>
</tr>
<tr>
<td></td>
<td>comparative reference</td>
<td>I have two dogs. One loves cats.</td>
</tr>
</tbody>
</table>

From section 8.3 we know that the PI-children produce significantly fewer correctly formed clausal ellipsis constructions than the N-children from the Roelofs-population (1998), although morphological/syntactic correctness is a prerequisite for semantically/pragmatically correct use of clausal ellipsis. From section 8.4 it also became clear that the PI-children tend to have difficulties with explicating the specifier position of the functional head-category complementizer, covering
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subordinate conjunctions. We may therefore expect some semantic/pragmatic difficulties in this area. Here, we want to investigate whether the PI-children are as good in establishing cohesion as the N-children. And, is there comparable development with age?

Children have to learn to fit their communicative contributions into the ongoing discourse by using cohesive devices. They therefore have to learn to connect the language information expressed to prior (given) information. Three main principles are involved in using cohesive devices. First, children have to learn what information to make explicit. For instance, they have to learn to express coordinating and subordinating conjunctions explicitly in the correct form and the proper position in the sentence. Second, they have to learn what information to leave unexpressed and implicit, for instance, in clausal ellipsis constructions. Third, children have to learn to refer by other words to the same issues, for example, when establishing co-referential and lexical cohesion (e.g. Koster, 1993:1). All cohesive devices have in common that the semantic interpretation of a linguistic unit is (partly) dependent on prior mentioned information in the discourse (Halliday and Hasan, 1976:4); and, by use of cohesive devices, it is made possible to express a maximum of meaning with a minimum of words.

From Chapter 12, it can be said that the use of cohesive devices to achieve cohesion falls under the Maxim of Manner: be clear (see 12.7). The Maxim of Quantity must also be followed in the case of co-referential cohesion and clausal ellipsis: leave implicit what has been mentioned already (see 12.6). Both Maxims of Manner and Quantity are closely related to the Maxim of Relevance (Grice, 1975; Sperber and Wilson, 1986). If both maxims are followed, a communicative contribution can be judged as being relatively more relevant, creating a greater communicative effect with relatively limited linguistic effort. However, both speaker and listener probably have to exert more computational effort in order to grasp the message.

In sum, successful participation requires that children (analyse and) express different cohesive chains in the ongoing conversation by means of different cohesive devices. When children frequently and correctly use cohesive devices, this influences the quality of the interview positively. Thus, the amount of correctly used cohesive devices per interview is globally indicative of the ability to transmit relevant, cohesive information.

In general, when N-children become older, they become more cohesive (Bishop and Adams, 1989). LI-children, however, have difficulties using cohesive devices correctly, for instance, in establishing clear co-referential cohesion (Sahlén and Nettelbladt, 1993). In order to investigate the use of cohesive devices in the PI-children as compared to the N-children, we made a selection of different types of cohesive devices. In the following, we will present the analysis of the use of clausal

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1 The use of adverbial cohesion is incorporated in the analysis of jumps (see 12.5: Violations of the Maxim of Quantity). Nominal ellipsis and lexical cohesion of nominals are coded under the heading
The use of cohesive devices

ellipsis (13.2) and the use of connectives, such as conjunctions and subjunctions (13.3). We will present the results with respect to co-referential cohesion (13.4), divided into the ability to produce clear referent introductions (13.5), referent maintenances (13.6) and referent shifts (13.7), ending with some conclusive remarks about the ability to establish co-referential cohesion (13.8). Finally, we will end with an overview of the ability to transmit relevant information by means of cohesive devices (13.9). If we detect difficulties in this area, especially in the realization of co-referential cohesion, this might very well be a good indication of a semantic/pragmatic disorder (e.g. McTear and Conti-Ramsden, 1992; Van den Dungen and Verbeek, 1994, 1999) (see 1.2).

13.2 Clausal Ellipsis

13.2.1 Research questions, definitions and operationalisations
Grammatical clausal ellipsis consists of the regular omission of one or more sentence constituents, frequently the lexical categories, subject and verbal predicate that are redundant with respect to a prior message (see 8.3) (Root, 1992; Renkema, 1993:38; Haeseryn et al., 1997). Instances of clausal ellipsis were described that were grammatically correctly used (see 8.3). In this way the ability to produce complex, reduced clauses was measured; these clauses are a one-to-one mapping of morphological/syntactic categories that are left implicit without causing ungrammaticality.

Here, we look at the same instances, but from a different perspective, namely from a semantic/pragmatic point of view. When clausal ellipsis is morphologically/syntactically incorrect (see 8.3), the clausal ellipsis construction is also semantically/pragmatically incorrect, since no clear cohesion is established. Then the Maxims of Quality and Relevance are violated (in a different way than presented in 12.8). But when a clausal ellipsis is morphologically/syntactically correct, it can still be semantically/pragmatically inappropriate.

Instances of semantically/pragmatically (S/P) correctly used clausal ellipsis are described in order to determine the complex ability to achieve cohesiveness in the conversational interview genre by the elimination of redundancy by means of clausal ellipsis. We want to explore whether the amount of S/P correctly used clausal ellipsis constructions in the PI-children is comparable to the amount in the N-children. And, is there comparable development with age?

In order to answer the question we first counted all instances of clausal ellipsis, earlier mentioned in the Dutch developmental literature as 'ellipsis' or 'elliptical answer' (Van den Dungen and Verbeek, 1994, 1999). In the conversational interview genre open or alternative questions expressed by the interviewers frequently give N- and PI-children the choice to answer with a clausal ellipsis construction (Example 1) or not.

of co-referential cohesion. The grammaticality of verbal ellipsis is coded under the heading of conjunction reduction (see 8.4).
Example 1  Clausal ellipsis; conversational topic: catching a crab on the beach (PI-child; age 8;7)

Interviewer: hoe had je die gevangen?
     (how did you catch it?)
Benjamin: met mijn vinger.
         (with my finger)
Paraphrasis: I caught it with my finger (hands?).

As mentioned above (see 13.1), since the PI-children produce significantly fewer correctly formed clausal ellipsis constructions than the N-children from the Roelofs-population (1998), we expect to find a lower amount of semantically/pragmatically correct clausal ellipsis constructions in the PI-children than in the N-children. If this difference is significant, the ability to establish clear cohesion by means of clausal ellipsis constructions would seem to be problematic for some PI-children.

Next, on the basis of a morphological/syntactic (M/S) paraphrasis and semantic/pragmatic (S/P) paraphrasis, errors/violations in both language areas were identified (Example 2).

Example 2  MS and SP incorrect clausal ellipsis (PI-child; age 8;9)

Interviewer: wat vind je leuk speelgoed om mee te spelen?
     (what toys do you like to play with?)
Robert: *televisie.
      (*television)
MS Paraphrasis: *I like to play television
I like to play with a television
SP Paraphrasis: *I like to play with a television
I like to watch television instead of playing with toys

In Example 2, the MS Paraphrasis shows that by leaving the article 'a' unexpressed the PI-child does not express the functional head within a noun phrase. This may be related to difficulties in identifying the boundaries of a noun phrase. This type of morphological/syntactic incorrectness was frequently observed in the PI-children (see 8.3.3).

Next, the SP Paraphrasis shows that the PI-child is not establishing a clear cohesive relationship between the question asked and the answer given. When we 'fill in' the clausal ellipsis construction after morphological/syntactic correction, the contribution '*I like to play with a television' is judged to be incohesively linked to the previous one. The PI-child is erroneously presenting a television as a toy to play with: a semantic error. The pragmatic contingency of the answer is then affected and pragmatically marked. In the next section, we will present the results of the semantic/pragmatic analysis that concerns the ability to establish clear cohesive links by means of clausal ellipsis constructions.
13.2.2 Results: Clausal Ellipsis
Although we know from 8.3 that the PI-children produce a number of clausal ellipsis constructions comparable to the N-children, from Figure 13.1 it is obvious that the PI-children (32.3%) produce significantly more clausal ellipsis than the N-children (24.6%) in reaction to first pairparts expressed by the interviewer.

Figure 13.1  The percentage clausal ellipsis calculated over all second pairparts expressed by 75 N-children and 120 PI-children

<table>
<thead>
<tr>
<th>Age</th>
<th>N-chi: % clausal ellipsis</th>
<th>PI-chi: % clausal ellipsis</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 yrs</td>
<td>24.3</td>
<td>29.8</td>
</tr>
<tr>
<td>5 yrs</td>
<td>22.4</td>
<td>31.9</td>
</tr>
<tr>
<td>6 yrs</td>
<td>22.8</td>
<td>34</td>
</tr>
<tr>
<td>7 yrs</td>
<td>23.9</td>
<td>28.5</td>
</tr>
<tr>
<td>8 yrs</td>
<td>29.9</td>
<td>37.3</td>
</tr>
<tr>
<td>9 yrs</td>
<td>39.5</td>
<td></td>
</tr>
</tbody>
</table>

These clausal ellipsis constructions were not judged here as to whether they were minimal or not (see 11.3). A high amount of minimal clausal ellipsis constructions is also indicative for being unmotivated to engage in communicative interaction (see 2.3.1). This has been frequently observed in LI-children (e.g. Fey and Leonard, 1983; Van den Dungen and Verbeek, 1994, 1999). Unlike the LI-children, the PI-children use a comparable amount of minimal clausal ellipsis constructions compared to the N-children (see 11.3.2).

The N- and PI-children, however, seem to produce relatively many clausal ellipsis constructions. This is different from the results obtained from 10 English-speaking Specific LI-children and 10 same-aged N-children (7;0 tot 10;0 years) in research by Craig and Evans (1993). These N- and Specific LI-children were observed to produce ellipsis so infrequently that it could not be statistically analysed.

From Figure 13.2 we see that the PI-children make more incorrect clausal ellipsis in terms of semantics/pragmatics than the N-children. This difference proved to be

---

2 ANCOVA with the mean total number of second pairparts of the child as covariate; group effect F(1,164)=23.37, p<0.001; no age- or age*group interaction effect was observed (nine-year-old PI-children excluded).
highly\(^3\) significant. We also compared the percentage of clausal ellipsis constructions that are morphologically/syntactically (M/S) incorrectly formed (see 8.3) and semantically/pragmatically (S/P) incorrectly used. Up to the age of six years clausal ellipsis constructions were incorrect mainly in morphology and syntax and when paraphrased, were less often semantically/pragmatically incorrect. This relationship changes at age six when the morphological and syntactic errors decrease and therefore the semantic/pragmatic problems are highlighted.

\(3\) ANCOVA with the mean total number of ellipsis as covariate; group effect: \(F(1,164)=92.13, p<0.0001\); no age- or age\(^*\)group interaction effect was observed (nine-year-old PI-children excluded).

13.2.3 Conclusion: Clausal Ellipsis

The PI-children have difficulties in establishing clear cohesion between an initiative of the PI-interviewers and their own responses by means of clausal ellipsis compared to the N-children; no clear cohesion is established by means of clausal ellipsis in, on average, one out of four instances in the PI-children, whereas this is only the case in less than one out of ten instances in the N-children. We showed that the younger PI-children could not establish clear cohesion by means of clausal ellipsis constructions mainly because of morphological/syntactic difficulties. The older PI-children could not establish clear cohesion by means of clausal ellipsis constructions mainly because of semantic/pragmatic difficulties.
13.3 Conjunctions and Subjunctions in conversation

13.3.1 Definitions, research questions and operationalisations

Co-ordinating conjunctions and subordinating conjunctions, further referred to as conjunctions and subjunctions, are linguistic devices that can be used in order to establish cohesion. By the use of conjunctions T-units can be connected and by the use of subjunctions within a T-unit subordinate clauses can be connected to a main clause and relative clauses can be connected to noun phrases (see 8.5). We coded the different types of conjunctions divided by Halliday and Hasan (1976) and different types of subjunctions divided by Scheper (1996), following the first application by Roelofs (1998:117-119). Here, we look at the same instances, but from a different perspective, namely from a semantic/pragmatic point of view. Different types of conjunctions/subjunctions have different inherent meanings that by their use express how (within clauses) contributions are semantically connected (e.g. Smith and Leinonen; 1992:85). All types are language-specific in their content, form and function; in Dutch they are related to certain word-order rules (Geerts et al., 1984:642-743; Haegeman, 1991; Haeseryn et al., 1997:1379). The semantic meaning of the used sub/conjunctions and the impact on the pragmatic level is of most importance here. Whereas in Dutch conjunctions can be an optional grammatical category, subjunctions are always grammatical obligatory. However, co-ordinating conjunctions can only be morphologically/ syntactically optional, if the meaning on how to cohesively connect two contributions is absolutely clear. Subjunctions are always grammatically obligatory in order to connect the left- and right-branched subordinate clauses and right-branched relative clauses in Dutch to their main clause (e.g. Haeseryn et al., 1997) (Table 13.2).

Table 13.2 Conjunctions and Subjunctions

<table>
<thead>
<tr>
<th>Conjunctions</th>
<th>additive conjunction</th>
<th>adversative conjunction</th>
<th>causal conjunction</th>
<th>temporal conjunction</th>
<th>continuative conjunction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>en (and); or (of)</td>
<td>maar (but); alleen (only)</td>
<td>want (because)</td>
<td>dan (then); toen (then); en toen/ en dan nou (well)</td>
<td></td>
</tr>
<tr>
<td>Subjunctions</td>
<td>no types divided⁴</td>
<td>dat (that)</td>
<td>omdat (because)</td>
<td>zodat (so that) etc.</td>
<td>terwijl (in the mean while)</td>
</tr>
</tbody>
</table>

At the age of three N-children start to use conjunctions, followed by subjunctions (Bol and Kuiken, 1988; De Houwer, 1990). They start to learn to use additive and temporal linkage before adversative and causal linkage of contributions (see 8.5).

⁴ The same subtypes can be divided for subjunctions as for conjunctions (Scheper, 1996).
This means that before age six, N-children in general mostly use simple conjunctions to connect simple sentences, such as 'and', 'then' and 'and then', whereas 'but', 'thus' or 'because' are very infrequently used (Peterson and McCabe, 1992; Benson, 1993). From age six on, N-children learn to cohesively link contributions by means of different types of conjunctions and subjunctions in different contexts.

Like Swedish-speaking Specific LI-children (Hakansson and Hansson, 2000) (see 8.5), the PI-children make more morphological/syntactic errors in the production of co-ordinating and subordinating conjunction, such as leaving them unexpressed, compared to the N-children (see 8.5).

Here, we want to explore whether the amount of semantic/pragmatically correctly used conjunctions and subjunctions in the PI-children is comparable to the amount in the N-children. And, is there comparable development with age?

We not only examined if the distribution of the different types of conjunctions and subjunctions is the same in the PI- and N-children, but we also made an error-analysis. We may expect some problems in this area in the PI-children compared to the N-children, although with age the use of these types of connectives in order to establish cohesion is expected to improve in both populations.

13.3.2 Results: Conjunctions and Subjunctions

From Figure 13.3 we see that the PI-children produce significantly fewer conjunctions than the N-children. Thus, the PI-children lag behind in their development of the cohesive use of conjunctions. Unexpectedly, post-hoc trend analysis showed no significant linear increase of the production of conjunctions in either group (see also Roelofs, 1998:119).

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5 We excluded the connective conjunctions n(w) (well), because in Dutch this type of conjunctions was difficult to separate from interjections in a reliable way.

6 The percentage expressed conjunctions and subjunctions was calculated over the mean total number of communicative contributions (except for yes/no-responses) per child. For the statistical analysis we used an ANOVA (the ANCOVA was of no use here, because with respect to the covariant 'the number of communicative contributions coded for topic' no significant group effect was found). Group effect: F(1,165)=14.57, p<0.001; age effect F(4,165)=3.59, p<0.008; no significant age*group interaction effect was observed (nine-year-old PI-children excluded).

With respect to the different types of conjunctions we used ANCOVA's with the mean total number of conjunctions as covariate. To interpret the results of the error-analysis, we used an ANCOVA with the mean total number of conjunctions, respectively subjunctions as covariate.

7 Oneway ANOVA over percentages.
With the production of subjunctions an even greater degree of complexity is involved than in the use of conjunctions in Dutch, because the use of subjunctions is connected to a word-order specification within the subordinate clause, namely that the inflected verb must be in sentence-final position (see 8.5). We indeed observed a relatively infrequent production of subjunctions (N-children: 7.2%; PI-children: 5.5%) (Figure 13.4) when compared to the production of conjunctions (N-children: 48%; P-children: 40%) (nine-year-old PI-children excluded).

We see that the PI-children also produce significantly fewer subjunctions than the N-children. The developmental pattern of the production of subjunctions resembles a reversed U-curve: the six- and seven year-olds in both groups use relatively many subjunctions. Therefore, no linear age effects are found in either population.

Roelofs (1998:119) showed with respect to the ability to establish cohesion by means of con/subjunctions, that there is a decrease in the production of con/subjunctions in the eight-year-old N-children that corresponds with earlier Dutch reports about a similar developmental pattern found in the 240 N-children from the STAP-population (Van den Dungen and Verbeek, 1999; see 3.2.2). The PI-children show a comparable developmental pattern but we do not have an explanation for this yet.

---

8 ANOVA over percentages; group effect: F(1,165)=8.22, p<0.005); age effect F(4,165)=3.78, p<0.006); no age*group interaction effect was observed (nine-year-old PI-children excluded).
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Figure 13.4 The percentage subjunctions calculated over all communicative contributions (coded for topic) expressed by 75 N-children (Roelofs, 1998) and 120 PI-children

<table>
<thead>
<tr>
<th>Year</th>
<th>N-chi: % subjunctions</th>
<th>PI-chi: % subjunctions</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 yrs</td>
<td>5.4</td>
<td>3.8</td>
</tr>
<tr>
<td>5 yrs</td>
<td>6.3</td>
<td>5.2</td>
</tr>
<tr>
<td>6 yrs</td>
<td>8.9</td>
<td>6.7</td>
</tr>
<tr>
<td>7 yrs</td>
<td>8.3</td>
<td>6.7</td>
</tr>
<tr>
<td>8 yrs</td>
<td>7.1</td>
<td>5.1</td>
</tr>
<tr>
<td>9 yrs</td>
<td>6.0</td>
<td>6.0</td>
</tr>
</tbody>
</table>

In Table 13.3 the distribution of the different types of conjunctions is presented. We observe that the PI-children use significantly fewer additive\(^9\) and significantly more temporal conjunctions\(^10\) than the N-children. Post-hoc trend analysis showed no linear age-effects\(^11\) in both populations.

<table>
<thead>
<tr>
<th>Conjunction types</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=75</td>
<td>n=120</td>
</tr>
<tr>
<td></td>
<td>Add</td>
<td>Adv</td>
</tr>
<tr>
<td>4 yrs</td>
<td>58%</td>
<td>22%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>57%</td>
<td>22%</td>
</tr>
<tr>
<td>6 yrs</td>
<td>58%</td>
<td>18%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>64%</td>
<td>19%</td>
</tr>
<tr>
<td>8 yrs</td>
<td>58%</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td>59%</td>
<td>20%</td>
</tr>
</tbody>
</table>

The N-children most frequently use additive conjunctions (59%), followed by adversative (20%), causal (13%) and temporal (8%) conjunctions. The production of

\(^9\) ANCOVA with the number of all conjunctions as covariate; group effect \(F(1,164)=53.30, p<0.0001\); no age- or age*group interaction effect was observed (nine-year-old PI-children excluded).

\(^10\) ANCOVA with the same covariate; group effect \(F(1,164)=103.00, p<0.0001\); age effect \(F(4,164)=2.90, p=0.024\); no age*group interaction effect was found (nine-year-old PI-children excluded); no linear age effect (Polynomial).

\(^11\) ANCOVA (Polynomial contrast): no significant linear age effect are found in both populations (nine-year-old PI-children included).
causal conjunctions increases (9% to 13%) and the production of temporal conjunctions decreases (10% to 8%) between four and five years of age in the N-children. This may indicate that the development of using semantically more complex connections starts at age five in the N-children.

These results do not confirm earlier reports about the development of conjunctions (Berman and Slobin, 1994) that showed a rapid significant decrease with age in the production of additive and temporal conjunctions, also called markers of sequentiality, in school-aged N-children. This difference is probably due to differences in research design.

In the PI-children we see a different distribution in the use of conjunction types: additive conjunctions (44%) are used most frequently, followed by temporal (26%), adversative (20%) and causal conjunctions (11%). Between four and five years of age, the production of causal conjunctions also increases (8% to 13%) and of temporal conjunctions also decreases (32% to 18%) in the PI-children, comparably to the N-children.

It appears that around five years, the N- and PI-children start to reduce the production of additive/temporal conjunctions for successive cohesive linkage in favour of adversative/causative conjunctions for logical/hierarchical cohesive linkage. However, the production of temporal conjunctions in the PI-children stays relatively high even in the oldest age groups. A closer look at the data shows that they frequently use only two types 'en toen' (and then past tense) and 'en dan' (and then present tense) and 'en toen' (and then near future in past time) and 'en toen' (and then near future in present time), often in successive chains (and then... and then... and then...). This indicates a disability in using more precise adverbs to express temporal sequentiality (see also 5.7 and 6.3). This marker of sequentiality was also coded by Berman and Slobin (1994), who observed a reduction from 26% (calculated over all conjunctions) in English-speaking four-year-olds to 15% in the nine-year-olds. We therefore have the impression that the nine-year-old PI-children behave like four-year-old N-children.

The ability to make causal cohesive linkages is the most important for successful communication (Bishop, 2002), but also the most difficult to learn. Causal conjunctions are least frequently used by the PI-children, even in the oldest age groups, compared to the N-children.

Next, how many errors in the cohesive use of conjunctions and subjunctions can be found in the PI-children? Omissions of specific types of conjunctions and subjunctions are excluded here, because they are described elsewhere in detail (see 8.4 and 8.5). In the following, we will give some examples of semantically/pragmatically (S/P) incorrect cohesive use of conjunctions (Examples 3 to 6) and subjunctions (Example 7).

12 'en toen' (and then past tense) 'en dan' (and then present tense) are coded as temporal conjunctions ('en' (and) in both constructions was not coded as a separate additive conjunction, since 'toen' and 'dan' are adverbs of time used as conjunctions (called 'voegwoordelijke bijwoorden' in Dutch; Geerts et al., 1984-90; Schepers, 1996).
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Example 3  Semantic/pragmatically incorrect cohesive use of an additive conjunction (PI-child; age 4:2)

Interviewer: wat eet je graag op je boterham? (what do you like to eat on your bread?)
Willem: → *en één met pindakaas. (and one with peanutbutter)
Paraphrasis: peanutbutter.

In Example 3, the additive conjunction suggests that there is prior information about another slice of bread, which was not the case. The 'en' (and) is not appropriate.

Example 4  Semantic/pragmatically incorrect cohesive use of an adversative conjunction (PI-child; age 4:7)

Charlie: de juf leest ons elke dag voor. (the teacher reads to us everyday)
Charlie: → maar de juf heeft zo’n boek. (but the teacher has got such a book)
Paraphrasis: and the teacher has got such a book.

In Example 4, the PI-child uses 'maar' (but) instead of 'en' (and). Another example of the same type is the semantically marked cohesive use of 'and' (additive conjunction) instead of 'but' (adversative conjunction), or 'want' (because; used as conjunction; no equivalent in English) instead of 'en' (and) (Example 5).

Example 5  Semantic/pragmatically incorrect cohesive use of a causal conjunction (PI-child; age 4:9)

Interviewer: is Daniella jouw zus? (is Daniella your sister?)
Kevin: nee (no)
Kevin: → want ze is al groot (because she is already tall/grown up)
Paraphrasis: and she is already tall/grown up

In Example 5, the conjunction 'want' (because; conjunction) is marked because it illogically connects contributions. This use only makes sense if the PI-child were to think that someone can only be a sister if they are small.

Example 6  Semantic/pragmatically incorrect cohesive use of a temporal conjunction (PI-child; age 4:11)

Rick: het was in de avond. (it was in the evening)
Rick: → en dan ging ik stoeien met mijn hond. (and then (present) I started playing with my dog)
Paraphrasis: en toen ging ik stoeien met mijn hond (and then (past) I started playing with my dog)

Example 6 is illustrative for a disagreement between the tense expressed by the conjunction and verbal markers for past tense (see also 7.2).
Marked use of subjunctions frequently are characterized by a semantic mismatch that was also coded as a morphosyntactic error (Example 7).

Example 7  
Semantically/pragmatically incorrect use of a subjunction (PI-child; age 5;1);

Louis: dat duurt nog lang # tot ze twee is.
Paraphrasis: dat duurt nog zo lang, namelijk totdat ze twee is.
(that (=getting teeth) takes so long, namely until she is two)

In Table 13.4 we present the frequency of errors in the cohesive use of conjunctions and subjunctions made by the PI-children; no data are available for the N-children. We see that the amount of cohesive conjunction errors of all types (mean total: 7%) is comparable to the amount of cohesive subjunction errors (7%).

When we look at the conjunction errors, we see that - as could have been expected - the PI-children make relatively few errors in the production of semantically less complex and most frequently used additive/temporal conjunctions, but make relatively many errors in the production of the more complex and less frequently used adversative/causal conjunctions.

The relatively high production of temporal conjunctions by the PI-children (Table 13.3) seems to resemble that of N-children younger than four years (Peterson and McCabe, 1992). The PI-children mostly use temporal conjunctions cohesively and correctly to express a temporal meaning; they only make 3% errors (Table 13.4). N-children in contrast frequently overgeneralize the cohesive use of temporal conjunctions in order to express, for instance, adversative and causal connections.

<table>
<thead>
<tr>
<th>Incorrectly used Conjunctions/ Subjunctions</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Conjunctions</td>
</tr>
<tr>
<td></td>
<td>Additive</td>
</tr>
<tr>
<td>4 yrs</td>
<td>11%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>2%</td>
</tr>
<tr>
<td>6 yrs</td>
<td>4%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>1%</td>
</tr>
<tr>
<td>8 yrs</td>
<td>2%</td>
</tr>
<tr>
<td>Total</td>
<td>4%</td>
</tr>
</tbody>
</table>

We see that from age five on, fewer errors are made in the cohesive use of all conjunction types, although in the higher age groups, especially in the nine-year-old PI-children, relatively many errors are still made. When we look at the production of
subjunctions, we see another, non-comparable pattern. The six-year-old PI-children not only produce relatively many subjunctions, but also produce most errors. Unexpectedly, no significantly\(^{13}\) linear decrease with age in the amount of errors in the cohesive use of conjunctions and subjunctions in the PI-children was observed.

### 13.3.3 Conclusion: Conjunctions and Subjunctions

The PI-children show difficulties in the ability to establish clear cohesion by means of conjunctions and subjunctions. The PI-children use significantly fewer conjunctions and subjunctions than the N-children and make relatively many errors (7% of all cases) in the cohesive use of conjunctions and subjunctions. The developmental patterns in the production of conjunctions and subjunctions by the N- and PI-children resemble more or less a flat reversed U-curve, we have no explanation for at this moment. Relatively many errors are still made by the PI-children in the higher age groups. Possibly, the overall integration of multileveled linguistic information in the older age-groups can cost so much planning effort that the fine-tuned use of conjunctions and subjunctions in order to establish cohesion somehow stagnates.

### 13.4 Co-referential Cohesion in conversation: an introduction

Co-referential cohesion deals with a semantic cohesive relationship that can be expressed between entities that are named by words. To mention an entity for the first time is coded as *first mention* and to mention the same entity again is coded as *subsequent mention*. The word used for subsequent mention, called *referent* (e.g. the personal pronoun 'he'), refers to its *antecedent* (e.g. the boy), that is the word used for first mention within the conversational interview (or narrative). Antecedent and referent both refer the same mental representation of an entity (e.g. Renkema, 1993:38).

To mention entities and maintaining reference to them over several communicative contributions is also one of the major developments in school-aged children. Roelofs (1998:120) showed that the 75 N-children improve this ability with age; the older N-children make fewer unclear introductions and maintain reference more clearly by means of pronouns than the younger N-children.

In order to use various referential devices clearly and intelligibly, children have to learn semantic/pragmatic cohesive rules for elements internal to the T-unit, that are largely based on morphological/syntactic rules, called binding principles (e.g. Lust, 1986). They also have to learn similar rules for elements external to the T-unit. The latter have not yet been fully described in the literature. Use of clear referential devices is not only a crucial condition for constructing cohesive longer turns, but also for constructing coherently topic-related answers in the conversational interview genre (see 12.1).

As opposed to the N- and PI-children, the interviewers - as is the case with listeners in general - have to infer the cohesive semantic relation between a referent and its

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\(^{13}\) ANCOVA (Polynomial contrast) with the number of subjunctions as covariate; no linear age effect was found (nine-year-old PI-children included).
antecedent. The listener uses different linguistic cues and weights them against each other in order to come to the best-guess interpretation.

The following cohesive cues have been discussed in the literature for Dutch (e.g. Koster, 1993:3) and English (Chomsky, 1981; Lust, 1986):

1. when the lexical meaning of the referent and its antecedent, like number and gender, are the same or the lexical relationships (e.g. super- to subordination within a semantic field) is clear, then referent and antecedent are very likely to be cohesively bound;
2. when the lexical meaning and semantic characteristics of the verbs involved clearly cohesively link referent and antecedent (e.g. 'I am called Bart'), then referent ('Bart') and antecedent ('I') are very likely to be cohesively bound;
3. when the syntactic and thematic role of the referent (e.g. 'he is walking') and its antecedent ('the old man is outside') are identical, then referent ('he') and antecedent ('the old man') are very likely to be cohesively bound;
4. when the word-order positions of the referent ('who loves you') and its antecedent (e.g. 'the man') leave no or little language material in between, then referent ('who') and antecedent ('he') are very likely to be cohesively bound (in 'the man who loves you').

The right interpretation of the distance between the referent and its antecedent (locality), and of the level of sentence-embedding of the referent and its antecedent (prominence) seem most important in order to understand different co-referential cohesive relationships.

With respect to relevancy (see 12.2), a communicative contribution is said to be optimally relevant when it is easy for the interviewer to compute the referential connections between old and new information with a minimum of processing effort. This effort on the part of the interviewer can be minimized by the child by establishing clear and simple co-referential relations between words that depict living entities. We limited our analysis to co-referential cohesion between living entities (+animate)\(^{14}\) in order to be able to compare our results to those of Roelofs (1998:115) and others. Thus, the amount of correctly used referent introductions and subsequent mentions is globally indicative of the ability to transmit cohesive and relevant information.

Here, we want to know whether the PI-children show a developmental pattern comparable to that of the N-children with respect to the ability to establish clear cohesion by means of co-reference. And, is there development with age?

In order to answer this question, we first had to compare the PI-children's referent production (all antecedents plus subsequent mentions) by means of different linguistic devices with that of the N-children. From this analysis it became clear that

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\(^{14}\) We limit our analysis to the cohesive devices used to establish cohesion between living entities (+animate), following Karmiloff-Smith (1979), Bamberg (1987), Kail & Hickmann (1992), Wigglesworth (1990), Aarssen (1996) and Roelofs (1998). In the conversational genre, we excluded I and you (singular) referring to speaker and listener, although these referents play a role in the coding of referent maintenance versus shift.
both N- and PI-children produce a comparable amount\textsuperscript{15} of referents. This result resembles earlier results with respect to a comparable amount of noun phrases that was observed in both groups (see 7.4; footnote 17). With age the number of referents linearly increases in the PI-children and is comparable to the increase\textsuperscript{16} in the N-children. In combination with earlier results with respect to the amount of NP's that remains stable over time (see 7.4), the increase of referents seems to be mainly caused by an increase of pronominal referents with age in both N- and PI-children.

Although the N-children improve the ability to express clear co-referential cohesive relations between words in the conversational interview genre (Roelofs, 1998), LI-children even at an older age tend to continue to have difficulties in this area (e.g. Adams and Bishop, 1989). We may expect some problems in this area in the PI-children based on earlier findings. For instance, in a pilot-study prior to this study, 13 Dutch-speaking PI-children (six five-year-olds and seven nine-year-olds, recruited from the same psychiatric clinic) produced significantly more unclear referents in the conversational interview genre than the N-children from the STAP-population (Dijkhuis, 1994). With age the ability to establish clear co-referential cohesive relations is expected to improve in both populations.

Referents can be divided into first and subsequent mentions. When subsequently a reference is made to the same entity, this is called referent maintenance. Referent shift on the other hand, is coded when subsequent reference is made to a different entity. Each referent expressed by the N- and PI-children is judged either as being unclear or clear. The amount of clear referents is not only globally indicative for the ability to use cohesive devices, but also for the ability to take into account the interviewer's point of view\textsuperscript{17} (De Villiers, 2001a, 2001b).

In the next sections we will present the results with respect to co-referential cohesion, divided into referent introductions (13.5), referent maintenances (13.6) and referent shifts (13.7).

\textsuperscript{15} ANCOVA with the number of communicative contributions coded for topic as covariate; age effect $F(4,164)=4.79$, $p<0.001$. No age*group interaction effect was found (nine-year-old PI-children excluded).

\textsuperscript{16} ANCOVA (Polynomial contrast) with number of communicative contributions coded for topic as covariate; N-children: $F(4,69)=3.10$, $p<0.021$; Linearity: $p<0.018$; PI-children: $F(5,113)=2.39$, $p=0.042$; Linearity: $p<0.001$ (nine-year-olds included).

\textsuperscript{17} An alternative approach is to accentuate the co-referential cohesive relation as being clear as opposed to ambiguous (when a referent refers to two possible antecedents). A negative consequence of this method (Roelofs, 1998), we want to avoid, is that a referent 'he' can be coded as clear if its relationship with the antecedent 'he' is clear, although this antecedent 'he' can have been judged as depicting towards an unclear mental representation of a living entity. We choose to code subsequent mentions 'he' to an unclear antecedent 'he' (?) also as unclear in order to detect unclear pronominal chains, when the same pronoun was used successively. With permission of Roelofs, her data were adjusted on this point.
13.5 Referent Introduction in conversation

13.5.1 Research questions, definitions and operationalisations

The first time an entity is mentioned by the children, the form depends on whether the entity referred to is given (already known) or new (completely new) information for the interviewer (see for more information on this topic Hickmann, 2003). In Dutch, the preferred form for introducing a brand-new entity is an indefinite NP (indefinite article+Noun) in non-subject/focus-position (Aarssen, 1996:93) (Example 8).

**Example 8** First mention by means of an indefinite NP in non-subject/focus position (PI-child; age 5;11)

Robin: ik heb een broerje.
(I have got a brother)

In general, when children rightly presuppose that the first mentioned entity is about shared information (the information is also already known by the interviewer), a definite NP (e.g. possessive pronoun + NP) in subject/topic-position can be used (Example 9).

**Example 9** First mention by means of a definite NP in subject/topic-position (PI-child; age 5;5)

Mandy: mijn moeder ligt aan die kant
(my mother lies on that side)

But, when children wrongly assume that the interviewer knows a certain person by name and therefore use a proper name (= definite NP), the referent is judged as unclear (Example 10).

**Example 10** Unclear first mention by means of a proper name (PI-child; age 5;3/8)

Roel: en toen hadden we de vissen bij *Jan, in de vijver gedaan.
(and then we put the fishes by *Jan, in the pond)

Pronominal reference is the marked form for referent introduction. It can only be used correctly under special conditions, but mostly it leads to unclear referent introductions (Blankenstijn, 1996). In Table 13.5 we give an overview of clear and unclear (*) first mentions.

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18 By using an index, for instance the 'x', in 'the boy, he, walks' we indicate that the pronoun 'he' refers to the same entity 'x' as the NP 'the boy'.

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Here, we want to know whether the amount of clear referent introductions expressed by the PI-children is comparable to the amount expressed by the N-children. And, is there comparable development with age? From Roelofs (1998:120) we know that younger N-children produce more unclear referent introductions than older N-children. On the basis of previous research (Dijkhuis, 1994), we may detect more unclear referent introductions and a slower developmental rate in the PI-children.

13.5.2 Results: Referent Introduction in conversation
In the conversational interview genre, the PI-children produced significantly fewer referent introductions than the N-children. This means that the PI-children start to talk about persons or animals they know but the interviewer does not know less frequently than the N-children. This is of no surprise, since we mentioned before (see 11.7 and 12.9) that the PI-children have difficulties in the production of new information.

When we explored how many times the preferred form for referent introductions was used (i.e. indefinite NP in focus-position), the following developmental patterns can be seen: the N-children correctly expressed first mentions by means of an indefinite NP (in 27% of all cases) in subject/topic-position (22%) (see Example 8) and non-subject/focus-position (78%) (see Example 7). In the PI-children, the distribution of indefinite NPs (in 31% of all cases) in subject/topic (15%) as opposed to non-subject/focus-position (85%) does not significantly differ from the pattern found in the N-children. Since this pattern is stable over time, we can conclude that from four years of age on, both N- and PI-children figured out that in Dutch indefinite NPs used for referent introductions mostly have no topic function in conversation and are therefore placed in non-subject/focus position.

Next, we explored how many first mentions are semantically/pragmatically marked and unclear. This is the case, when children incorrectly use definite NPs or pronouns in case an indefinite NP is required, resulting in unclear first mentions (= referent introduction) (Figure 13.5).

19 ANCOVA with the mean total number of all references as covariate. group effect F(1,64)=26.20, p<0.001; age effect F(1,164)=10.60, p<0.0001; no age*group interaction effect was found (nine-year-old PI-children excluded).
The use of cohesive devices

Figure 13.5 The percentage unclear referent introductions calculated over the mean total number of referent introductions per age group expressed by 75 N-children (Roelofs, 1998) and 120 PI-children in conversation.

From Figure 13.5 we see that the PI-children in the younger age-groups produce fewer unclear referent introductions than the N-children with a turning point at age six. In the older age-groups the PI-children produce slightly more unclear referent introductions than the N-children. However, the differences are too small to observe a significant group effect. With age a linear decrease of unclear referent introductions is found in the PI-children similar to the decrease observed in the N-children (Roelofs, 1998).

The use of proper names, especially by the younger N-children, caused most unclear referent introductions (Roelofs; 1998:120). The PI-children, especially the younger age groups, mainly have difficulties with being explicit (see 5.3 and 5.4). Therefore, they produce fewer first mentions by means of a proper noun and thus make fewer mistakes of this type than the N-children. When the production of these linguistic devices, such as proper names and NP's, increases in the older aged PI-children, they produce relatively more unclear referent introductions than the N-children.

The PI-children expressed more unclear referent introductions (10%-25%) that were caused by morphological/syntactic and/or semantic/pragmatic inappropriateness compared to the N-children (0%-7%). This proved to be a significant group effect. A closer look at the data shows that roughly half of the inappropriate unclear referent introductions are caused by ungrammatical missing subjects (see 5.3) and

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20 ANCOVA with the same covariate; N-children: F(4,69)=11.14, p<0.0001; Linearity p<0.001; PI-children (nine-year-old PI-children excluded): no significant linear age effect; PI-children (nine-year-old PI-children included: F(6,113)=3.67, p<0.004, Linearity: p<0.0001.

21 ANCOVA with the number of unclear topic introductions as covariate; group effect: F(1,164)=19.34, p<0.001; No age- or age* group interaction effect was found (nine-year-old PI-children excluded).
objects (see 5.4) or by Determiner-Noun agreement errors in the PI-children (see 7.4). The other half of unclear referent introductions was caused by semantic mismatch (e.g. 'brother' instead of 'friend' or 'she/he'/it' substitutions). Frequently a clustering of difficulties in both areas causes unclear referent introductions (Example 11).

Example 11  Referential unclearness caused by morphological/syntactic and semantic/pragmatic inappropriateness (PI-child; age 6.5)

Alexander: ik zag een zwart Ø springen.
Paraphrasis: I saw a black Ø jumping.

Example 12 Referential maintenance (PI-child: age 5.5)

Mandy: we, hadden nog een vis,
       (we, had another fish)
Mandy: maar die, hebben we, bij onze buren, gebracht.
       (but that, he, we, brought to our neighbours)
Mandy: want die, was helemaal in zijn eentje.
       (because that, he, was totally alone)
The first mention of a new entity is 'een vis' (a fish), subsequently mentioned as 'die' (the demonstrative that). No other living entity is mentioned in between, and we coded this instance as referent maintenance. In the referential chain (a fish - that - that) the second that is not coded as referent maintenance, because we and neighbours are mentioned in between. It is coded as a referent shift (see 13.7). With respect to referent maintenance, the first mention or previous mention is called the antecedent ('a fish' is the antecedent of the first 'that'; the first 'that' is the antecedent of the second 'that'). Sentence internal and external reference maintenance both exist in conversation and are called endophoric reference. When established by means of one or more successive pronouns, this is called anaphoric reference (Halliday and Hasan, 1976). In Dutch, referent maintenance by means of a pronominal form (personal pronoun, demonstrative pronoun or zero-pronoun in case of topic-drop and gapping constructions) is the unmarked semantic/pragmatic form (Aarssen, 1996:91).

The most simple referent maintenance constructions occur when antecedent and referent are expressed in the same communicative contribution, such as an NP immediately followed by a support-pronoun (Example 13) or a pronoun followed by a proper name (Example 14).

Example 13  Referent maintenance within one contribution (PI-child: age 5;9)
Tijmen:  
en opa Japie, die zag het  
(and grandfather Japie, he saw it)

Example 14  Referent maintenance within one contribution (PI-child: age 5;2)
Interviewer:  
je hebt nog een broertje?  
(you have got another little brother?)
Attila:  
ja.  
(yes)
Attila:→  
hij, heet Istwan,  
(he, is called Istwan)

In Example 14, the PI-child also establishes clear co-referential cohesion by means of the antecedent 'brother' and the referent 'he'. This is another relatively simple and therefore frequently used construction in order to establish referent maintenance by means of an NP in the first and pronoun in the subsequent contributions. In this construction nearly no information (that covers a whole clause) is expressed between referent and antecedent. This is called Minimal Distance Strategy (e.g. Aarssen, 1996; Roelofs, 1998; see 13.6.2).

When children try to establish clear referent maintenance not following the Minimal Distance Strategy, this is supposed to be more difficult, especially when a non-animate entity is mentioned in between (Example 15).
Example 15  Clear referent maintenance with more information in between; conversational topic: pet-animals run in running mill (PI-child; age 5;11)

Julien:  dan gaan ze, door dat draaiding spelen.
         (then they go playing through that turning thing)
Julien:  want hij is wel dik, dat ding.
         (because he is thick that thing)
Interviewer:  wat is dik?
         (what is thick?)
Julien:  nou, zo'n draaiding.
         (well, such a turning thing)
Julien:→  daar lopen ze.
         (there they walk)

In Example 15, the PI-child succeeds in establishing clear referent maintenance between the referent 'they' in the last contribution and the 'they' in the first contribution with three contributions mentioned in between.

The development of T-unit-internal and T-unit-external anaphoric reference does not necessarily follow the same path (e.g. Koster, 1993:3). In case of T-unit-external pronominal reference maintenance, relatively more linguistic information can be said between the antecedent and its referent than in case of T-unit-internal pronominal reference maintenance. Then the information between referent and antecedent is not more than one T-unit. In case of T-unit-external pronominal reference maintenance relatively more computation effort seems therefore to be required based on all underlying executive functions Motivation, Attention, Memory and Coherence (see 2.3.1).

In Table 13.6 we give an overview of the forms coded as clear or semantically/pragmatically inappropriate, coded as unclear (*) or too clear (*) referent maintenance. The form coded as clear is dependent on the form used to express the first mention.
When the child uses an NP where a pronoun would have been better, following the nominal strategy (e.g. Bamberg, 1987), redundancy is not reduced and the referent is coded as *too clear (Example 16).

**Example 16**  
Referent maintenance coded as *too clear (PI-child; age 6;0)

Interviewer: slaap jij met je oudste broer op zolder?  
( do you sleep together with your eldest brother; in the attic?)
Marcel: ja.  
( yes)
Marcel: maar me broer, slaapt daarnaast  
( but my brother; sleeps next to it)
Paraphrasis: but he; sleeps in a room next to me

Furthermore, a zero-pronoun\textsuperscript{22} is only clearly used to establish referent maintenance in a gapping construction (he; ate an apple and \( \emptyset \); spit the pips out) or in case of topic-drop (Example 17) (see also 5.3, 5.4 and 8.4).

**Example 17**  
Correctly used zero-pronoun in a topic-drop construction to establish referent maintenance (PI-child; age 8;10)

Christiaan: maar niemand hoeft op hem; te passen.  
( but nobody has too look after him.)
Christiaan: \( \emptyset \); kan wel alleen thuis blijven.  
( \( \emptyset \); can stay at home alone)

\textsuperscript{22} Zero-pronouns are called implicit referents by Roelofs (1998:116-117) following STAP (Van den Dungen and Verbeek, 1999).
In sum, the form used to establish referent maintenance is highly dependent on the position in the sentence (topic-position), the verbal constructions used (gapping), the semantic meaning of the verb (such as naming verbs), the forms of other co-referential relationships used in the same successive contributions (Examples 15) and the form in which the antecedent is expressed, like its number and gender (e.g. Grober, Beardsley and Caramazza, 1978) or the determiner used (e.g. definite/indefinite article). Thus, morphological/syntactic and semantic/pragmatic abilities play a large role in the ability to maintain reference.

Here, we want to know whether the PI-children are as good as the N-children in the ability to establish clear referent maintenance. And, do they show a similar developmental pattern with age? In Dutch, a pronoun is the unmarked coding for referent maintenance. It might be expected that this preference will become more salient with age in both N- and PI-children, although we might detect a slower developmental rate in the PI-children.

13.6.2 Results: Referent Maintenance in conversation

First, the differences in the production of referent maintenances by means of an NP by the N- and PI-children proved to be insignificant (Figure 13.6). We see that the percentage of referent maintenances by means of an NP proved to be low to extremely low in the conversational interview genre, but significantly\(^23\) lower in the PI-children (2% to 8%) compared to the N-children (3% to 14%). The N-children produce significantly more too clear nominal referent maintenances, i.e. both antecedent and referent are expressed by a definite article+ NP, than the PI-children. This is of no surprise, because the N-children in general proved to be relatively more explicit than the PI-children, for instance, by expressing more lexical verbs, obligatory subjects/objects, prepositions and adverbs (see 5.2 to 5.7).

There is a linear decrease\(^24\) with age in the number of referent maintenances by means of an NP in both PI-children and N-children. Thus, in the conversational interview genre, the N- and PI-children learn with increasing age to use pronouns instead of NP's (together 100%) as the preferred cohesive device to establish referent maintenance over a number of two or more subsequent communicative contributions. From age four, in the PI- and N-population no children could be detected that solely use NP's for reference maintenance. From that age on both PI-and N-children start to use most frequently pronouns instead of NP's for referent maintenance.

\(^{23}\) ANCOVA with the number of referent maintenances as covariate; group effect: F(1,164)=13.11, p<0.001 (nine-year-old PI-children excluded).

\(^{24}\) ANCOVA (Polynomial contrast) with the number of referent maintenances as covariate; N-children: F(4,69)=3.71, p=0.009; Linearity: p=0.001; PI-children: F(5,113)=4.20, p=0.002; Linearity: p=0.0001 (nine-year-old PI-children included).
The use of cohesive devices

Figure 13.6 The percentage referent maintenance by means of an NP calculated over all referent maintenances expressed by 75 N-children (Roelofs, 1998) and 120 PI-children in conversation

In contrast to the most preferable and unmarked pronominal form for referent maintenance over a relatively short distance, the unmarked form in Dutch to establish referent maintenance over a relatively large distance is by means of a definite NP. A possible explanation for the fact that PI-children produce significantly fewer referent maintenances by means of definite NP than the N-children, can be found in the fact that in interviews with PI-children the distance between referent and antecedent is greater in the N-children than in the PI-children (Table 13.7).

Table 13.7 The percentage referent maintenance over a relatively short distance and over a relatively long distance (calculated over the mean total number of referent maintenances) in 75 N-children and 100 PI-children in conversation

<table>
<thead>
<tr>
<th>Distance between referent and antecedent</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=75</td>
<td>n=100</td>
</tr>
<tr>
<td>relatively short distance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) within one clause</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>(2) between two clauses</td>
<td>71%</td>
<td>76%</td>
</tr>
<tr>
<td>relatively long distance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>one or more clauses in between</td>
<td>14%</td>
<td>8%</td>
</tr>
</tbody>
</table>

Referent maintenance over a relatively short distance is defined as (1) the referent and its antecedent are both within one clause or (2) the antecedent is in the previous clause and its referent in the next clause. Referent maintenance over a relatively long
distance is defined as that (3) one or more clauses are between the antecedent and its referent. It can be said that the greater the distance between the referent and its antecedent, the greater the demands made upon the child's short-term-memory. Looking at the distance between the referent and its antecedent, the PI-children produce significantly fewer instances in which the antecedent is more than one clause removed from the referent. This result indicates that the PI-children are slightly delayed in establishing referent maintenance over a relatively larger distance compared to the N-children.

We also explored whether there are qualitative differences in the ability to correctly/clearly maintain reference between two clauses. Here we explored in how many cases the thematic subject strategy (also called parallel function strategy) was used as opposed the minimal distance strategy (Sheldon, 1974; Karmiloff-Smith, 1981; Bamberg, 1986; Aarsen, 1996; Roelofs, 1998:146) in order to establish clear coreferential cohesion.

In Dutch, when children use the thematic subject strategy in conversation, they establish referent maintenance by producing two or more successive clauses with a default surface-word order in which the subject/agent precedes the verb, and the antecedent and referent(s) (mostly personal pronouns) are both in subject/agent/topic position.

When children use the minimal distance strategy, they establish referent maintenance by producing two successive clauses in which the antecedent in the first contribution is in focus-position (at the end of the clause/ right-sided) and the referent in the second contribution, mostly a demonstrative pronoun, is in topic/agent/subject position with minimal distance between antecedent and referent (Example 18).

Example 18 Two instances of the application of the minimal distance strategy (PI-child; age 5;11)

Gerrit: wij hebben buren,
     (we have got neighbours)
Gerrit: → die, hebben hondjes,
       (these, have dogs)
Gerrit: → die, mogen wij uitlaten
       (these, we may take for a walk)

25 ANOVA; group effect: F(1,165)=23.26, p<0.001; no age effect or age*group interaction effect is observed (nine-year-old PI-children excluded).
The use of cohesive devices

Mostly, when the minimal distance strategy is followed, the referent in non-subject-position in the first contribution is the antecedent of the maintained referent in the second contribution in subject position

\[(1) \quad \text{---X---------------Y}_{\text{non-subject}} \]
\[(2) \quad \text{---Y}_{\text{subject(minimal distance)}}----------\]

The thematic subject strategy seems to be more complex than the minimal distance strategy, because more language material has to be stored and expressed between referent and antecedent.

\[(1) \quad \text{--Xthematic subject--------------Y--} \]
\[(2) \quad \text{--Xthematic subject--------------Y--} \]

We only counted thematic subject strategy or minimal distance strategy (1) when antecedent and referent, mostly personal pronouns, were mentioned in two successive clauses and (2) when both the antecedent and referent were judged as being both absolutely clear. Here, we explore whether the amount of parallel function/thematic subject strategy and minimal distance strategy used by the PI-children in order to establish clear co-referential cohesion is comparable to the N-children. And, is there comparable development with age?

From Table 13.8 we see that the PI-children use the thematic subject strategy fewer times and the minimal distance strategy more times than the N-children. These differences, however, are too small to observe a significant group effect with respect to both strategies.

Table 13.8  The mean total number of occurrences of clear co-referential cohesion in two successive clauses by means of the thematic subject strategy and the minimal distance strategy in 75 N-children and 120 PI-children in conversation

<table>
<thead>
<tr>
<th>Strategy</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=75</td>
<td>n=120</td>
</tr>
<tr>
<td></td>
<td>thematic subject</td>
<td>minimal distance</td>
</tr>
<tr>
<td>4 yrs</td>
<td>4.4</td>
<td>2.1</td>
</tr>
<tr>
<td>5 yrs</td>
<td>5.1</td>
<td>2.9</td>
</tr>
<tr>
<td>6 yrs</td>
<td>6.6</td>
<td>2.5</td>
</tr>
<tr>
<td>7 yrs</td>
<td>6.4</td>
<td>4.1</td>
</tr>
<tr>
<td>8 yrs</td>
<td>8.7</td>
<td>2.6</td>
</tr>
<tr>
<td>total mean</td>
<td>6.2</td>
<td>2.8</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

26 ANCOVA with the number of referent maintenances as covariate; Thematic subject strategy: age effect F(4,164)=4.63, p<0.03; Minimal distance strategy: age effect F(4,164)=3.20, p<0.015 (nine-year-old PI-children excluded).
Both age effects proved to be significant, although not linear. Before age seven, both strategies increase in both N- and PI-children. This indicates that in the school-aged children the ability to establish clear referent maintenance by both strategies improves. We see a turning-point between seven and eight years. At that time the minimal distance strategy decreases in favour of the thematic subject strategy, indicating that from age seven on N- and PI-children learn to use the more complex form of clear pronominal referent maintenance between clauses. The nine-year-old PI-children show that the use of the thematic subject strategy will increase beyond age eight/nine. The Dutch-speaking PI- and N-children in all age groups mainly use personal pronouns with the thematic subject strategy as opposed to demonstrative pronouns with the minimal distance strategy.

As mentioned above (Figure 13.6), N- and PI-children maintain reference mainly by using the preferred form that is a pronoun. This seems not to be influenced by its sentence position, its distance (between antecedent and pronominal referent) and the strategy used. As expected, the amount of pronominal referent maintenances increases with age: in the N-children from 86% to 97% and in the PI-children from 92% to 98% (see Figure 13.6: NP maintenance + pronoun maintenance = 100% maintenance). By pronominal reference, however, the chance to become unclear is increased compared to NP referent maintenance. Here, we want to explore whether the amount of clear pronominal referent maintenances in the PI-children is comparable to the N-children. And, is there comparable development with age?

In Figure 13.7 we present the percentage unclear pronominal referent maintenance, making no differentiation in distance between antecedent and referent. We see that the PI-children produce significantly more unclear pronominal maintenances than the N-children. The N-children in contrast hardly produce unclear pronominal maintenances in the conversational interview genre from an early age. We see that the nine-year old PI-children improve, but still do not quite reach the level found in the seven- and eight-year-old N-children. Relatively many unclear referent maintenances are caused by morphological/syntactic (MS) and/or semantic/pragmatic (SP) inappropriateness. This is significantly higher in the PI-children (18% to 56%) than in the N-children (0% to 7%). The PI-children have more problems than the N-children in choosing the right morphological/syntactic form or semantic/pragmatic content. For instance, the PI-children, even in the older age groups, still have difficulties in applying marking rules for gender (e.g. 'boy' is referred to with 'he', not with 'she'), number (e.g. 'boys' is not referred to with 'he', but with 'they') and verb agreement between referent or antecedent (e.g. *boys eats

---

27 Dutch is different from English in the forms that can be used in both types of strategies. In English the selection of independent demonstrative pronouns seems relatively more restricted than in Dutch.

28 ANCOVA with the number of all referent maintenances as covariate; group effect: F(1,164)=74.20, p<0.0001; no age- or age*group interaction effect was observed (nine-year-old PI-children excluded).

29 ANOVA over percentages; group effect: F(1,165)=54.67, p<0.0001; no significant age- and age*group interaction effects are observed (nine-year-old PI-children excluded). Because of small numbers, the ANCOVA could not be used.
and \( \emptyset \) drink') (see 7.3 and 7.4). The PI-children also use a zero-pronoun that leads to unclear referent maintenance more frequently than the N-children (see 5.3).

**Figure 13.7** The percentage unclear pronominal referent maintenances calculated over the total number of referent maintenances per age group expressed by 75 N-children and 120 PI-children in conversation.

<table>
<thead>
<tr>
<th></th>
<th>4 yrs</th>
<th>5 yrs</th>
<th>6 yrs</th>
<th>7 yrs</th>
<th>8 yrs</th>
<th>9 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-chi: % unclear maintenance</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>P-chi: % unclear maintenance</td>
<td>19</td>
<td>11</td>
<td>12</td>
<td>8</td>
<td>10</td>
<td>2</td>
</tr>
</tbody>
</table>

### 13.6.3 Conclusion: Referent Maintenance in conversation

Although the PI-children produce a comparable amount of referent maintenances compared to the N-children, there are some qualitative differences. First, the PI-children produce significantly fewer referent maintenances where more than one clause is expressed between the antecedent and the referent compared to the N-children. This may be related to the PI-children's tendency to limit their linguistic short term memory load. This tendency may, in turn, be related to executive (memory) dysfunctioning (see 2.3.1). This idea is not undisputable; when we look at the strategies used for clear pronominal referent maintenance between two clauses, the PI-children followed the thematic subject-strategy, this being the most complex strategy, more than the minimal distance strategy. The PI-children are thus comparable in this respect to the N-children.

Second, the N-children produce significantly more too clear nominal referent maintenances, whereas the PI-children produce significantly more unclear pronominal referent maintenances; a substantial percentage is caused by morphological/syntactic and/or semantic/pragmatic inappropriateness. This is hardly ever the case in the N-children. In cases of uncertainty, the N-children choose to be as explicit as possible as opposed to the PI-children, who tend to be rather implicit and thus vague.

In sum, this result confirms that PI-children as a group have difficulties in establishing clear co-referential cohesion by means of pronominal referent maintenances. Instances of unclear pronominal reference were significantly more...
frequently caused by morphological/syntactic and/or semantic/pragmatic errors in the PI-children than in the N-children.

13.7 Referent Shift in conversation

13.7.1 Research questions, definitions and operationalisations
As mentioned before, referent shift is coded when a subsequent mention is about another entity than the previous one. To establish clear co-referential cohesion by means of referent shifts is the most difficult, complex form of reference compared to referent introductions and maintenances. In case of referent shifts we also have to deal with endophoric reference (Halliday and Hasan, 1976), which is one of the possibilities to establish co-referential cohesion. In Example 19, nearly identical to Example 12, referent shifts are underlined.

Example 19 Referent shifts (PI-child: age 5.5; last contribution fictive)

Mandy: → we, hadden nog een vis.
Mandy: → maar die hebben we bij onze buren gebracht.
Mandy: → want die was helemaal in zijn eentje.
Mandy: → en onze buren hebben meer vissen om te letten.
must be referred to be means of a NP in order to stay clear (Blankenstijn, 1996). It was noticed, that only sophisticated adult speakers seem to have overcome this problem by using lexical verbs that can raise possible difficulties in clear pronominal referent shifts when referring to two entities of the same gender.

<table>
<thead>
<tr>
<th>previous mention $x$</th>
<th>previous mention $y$</th>
<th>Referent Shift $x$</th>
<th>Referent Shift $y$</th>
</tr>
</thead>
<tbody>
<tr>
<td>definite/ indefinite NP</td>
<td>definite/ indefinite NP</td>
<td>definite NP</td>
<td>definite NP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*indefinite NP</td>
<td>*indefinite NP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*zero (only if: gapping/topic drop)</td>
<td>*zero</td>
</tr>
<tr>
<td>pronoun</td>
<td>define NP</td>
<td>pronoun</td>
<td></td>
</tr>
<tr>
<td></td>
<td>if $x \neq y$ in gender &amp; number</td>
<td>if $x \neq y$ in gender &amp; number</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*pronoun</td>
<td>*pronoun</td>
<td></td>
</tr>
<tr>
<td></td>
<td>if $x=y$ in gender &amp; number</td>
<td>*pronoun</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*pronoun</td>
<td></td>
<td>*pronoun</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>if $x = y$ in gender &amp; number</td>
</tr>
<tr>
<td>prounoun</td>
<td>prounoun</td>
<td>*definite NP (too clear)</td>
<td>*definite NP (too clear)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*indefinite NP</td>
<td>*indefinite NP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*zero (only if: gapping/topic drop)</td>
<td>*zero</td>
</tr>
<tr>
<td></td>
<td>prounoun</td>
<td>prounoun</td>
<td></td>
</tr>
<tr>
<td></td>
<td>if $x \neq y$ in gender &amp; number</td>
<td>prounoun</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*pronoun</td>
<td>*pronoun</td>
<td></td>
</tr>
<tr>
<td></td>
<td>if $x = y$ in gender &amp; number</td>
<td>*pronoun</td>
<td></td>
</tr>
</tbody>
</table>

It is not difficult to imagine that establishing clear referent shifts is even more difficult than to establish clear referent maintenances. In the case of referent shifts, there is always a linguistic context in which the child is talking about more than one living entity at the same time, whereas in case of referent maintenance this is usually not the case. The ability to establish clear referent shifts may therefore be a later development at a slower rate compared to the development of referent introductions and referent maintenances. The ability to establish clear referent shifts may therefore still develop beyond age eight. Here, we want to know whether the amount of clear referent shifts expressed by the PI-children is comparable to the amount expressed by N-children. And, do they show a comparable developmental pattern with age?
13.7.2 Results: Referent Shift in conversation

The number of referent shifts per interview (N-children: 14; PI-children: 18) is in both populations lower than the production of referent maintainences (N-children: 20; PI-children: 20). This means that in the conversational interview genre, the N- and PI-children mostly talk about one living entity instead of two or more entities per contribution. The only exception is when children refer to themselves (mostly with 'I') and to the interviewer (with 'you').

Unexpectedly, the number of referent shifts in the PI-children proved to be significantly higher than in the N-children. The reason may be that the PI-children use the strategy of topic shading, moving from one conversational topic to the other, triggering referent shifts, more frequently than the N-children (see 12.1).

We explored the ratio between definite NP as opposed to pronoun shifts. Referent shift by means of a definite NP is the semantically/pragmatically unmarked coding. From Figure 13.8 we see that the PI-children (total mean: 43%) use a definite NP less than half of the time and the N-children half of the time (total mean: 51%). The PI-children produce NP referent shifts significantly less often than the N-children. Thus, the N-children are doing better than the PI-children. With age definite NP shifts decrease in both N- and PI-children.

Figure 13.8 The percentage referent shifts by means of a definite NP calculated over all referent maintainences expressed by 75 N-children and 120 PI-children in conversation

![Graph showing the percentage of referent shifts by means of a definite NP]

<table>
<thead>
<tr>
<th>Age</th>
<th>N-chi % defNP shift</th>
<th>P-chi % defNP shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 yrs</td>
<td>66</td>
<td>49</td>
</tr>
<tr>
<td>5 yrs</td>
<td>53</td>
<td>52</td>
</tr>
<tr>
<td>6 yrs</td>
<td>45</td>
<td>40</td>
</tr>
<tr>
<td>7 yrs</td>
<td>51</td>
<td>32</td>
</tr>
<tr>
<td>8 yrs</td>
<td>42</td>
<td>41</td>
</tr>
<tr>
<td>9 yrs</td>
<td>38</td>
<td>38</td>
</tr>
</tbody>
</table>

30 ANCOVA with the number of all referents as covariate; group effect: F(1,164)=11.42, p<0.001; no age- or age*group interaction effect was found (nine-year-old PI-children excluded).

31 ANCOVA with the number of all referent shifts as covariate; group effect: F(1,164)=6.65, p<0.04; age effect: F(4,164)=4.36, p<0.002; no age*group interaction effect was observed (nine-year-old PI-children excluded).
When pronominal shifts are used, the chances that these shifts are unclear increase (Figure 13.9). Unexpectedly, no significant\(^{32}\) group effect was found. With age the percentage unclear pronominal referent shifts decreases. We see that the four-year-old PI-children produce very many, the five- and six-year-olds relatively few and the older PI-children produce again relatively many unclear pronominal shifts compared to same-aged N-children.

Figure 13.9 The percentage unclear pronominal referent shifts (calculated over the total number of referent pronominal shifts) per age group expressed by 75 N-children and 120 PI-children in conversation.

![Graph showing percentage unclear pronominal referent shifts per age group]

<table>
<thead>
<tr>
<th>Age Group</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 yrs</td>
<td>33</td>
<td>56</td>
</tr>
<tr>
<td>5 yrs</td>
<td>33</td>
<td>23</td>
</tr>
<tr>
<td>6 yrs</td>
<td>23</td>
<td>20</td>
</tr>
<tr>
<td>7 yrs</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>8 yrs</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>9 yrs</td>
<td>0</td>
<td>16</td>
</tr>
</tbody>
</table>

In the conversational interview genre, relatively many pronominal shifts are clear and thus correct (N-children: 67% to 90%; PI-children: 44% to 84%). This may be explained by the fact that both N- and PI-children often talk about themselves, using the personal pronoun 'ik' (I), or they talk about themselves being part of the family or a group of friends, using the personal pronoun 'we' (we) in topic-position. Referent shifts in focus-position to other entities than themselves are more easy to manage, keeping the first person singular/plural referent (I/we) constant (Example 20).

Example 20 Clear pronominal referent shifts (PI-child: age 8,2)

Tanja: vanochtend had ik ont om mijn konijn te knuffelen. (in the morning I wanted to hug my rabbit)

Tanja: toen pakte ik de konijn uit de kooi (then I picked her up out of her hutch)

In Example 20, the PI-child correctly uses two clear pronominal shifts in two successive contributions. PI-children as young as four can do this, when both

\(^{32}\) ANCOVA with the mean total number of reference pronominal shifts as covariate; age effect: $F(4,164)=3.70, p<0.007$; no age*group interaction effect was observed (Nine-year-old PI-children excluded)
contributions are very simple in argument and thematic role structure. The use of the thematic subject strategy used in order to establish cohesive pronominal shifts has to be further explored in the future.

When taking into account all linguistic devices used for referent shifts, we observe that the PI-children (15% to 55%) produce significantly more unclear referent shifts than the N-children (0% to 7%) caused by morphological/syntactic and/or semantic/pragmatic inappropriateness. This proved to be a significant\(^3\) group effect. With age no linear decrease is observed. A closer look at the data shows that especially when older PI-children try to produce morphologically/syntactically and semantically/pragmatically more complex contributions, these contributions frequently were judged as ungrammatical or semantically/pragmatically marked compared to those of the same-aged N-children.

13.7.3 Conclusion: Referent Shift in conversation
The PI-children produce more referent shifts compared to the N-children, although both groups of children produce referent shifts (more complex) less frequently than referent maintenances (less complex). The PI-children produce significantly fewer shifts by means of a definite NP and more shifts by means of an indefinite NP (always unclear) or a (zero) pronoun (increasing the chance of being unclear). The PI-children as a group do not produce more unclear pronominal shifts. However, when they refer unclearly, this was significantly more frequently caused by morphological/syntactic and/or semantic/pragmatic inappropriateness compared to the N-children.

13.8 General conclusions: the ability to transmit relevant information: the ability to use cohesive devices
In general, we can conclude that the PI-children are not as good as the N-children in using clausal ellipsis, con/subjunctions and co-referential devices to establish clear cohesive linkages between communicative contributions. First, the PI-children use more clausal ellipsis and make significantly more semantically/pragmatically incorrectly used clausal ellipsis constructions compared to the N-children. Second, the PI-children are not as good as the N-children in the use of conjunctions and subjunctions (calculated over all communicative contributions) in order to establish cohesion. The PI-children use significantly fewer co-ordinating and subordinating conjunctions, and make significantly more mistakes compared to N-children\(^3\).

Third, with respect to co-referential cohesion, we see that the PI-children produce significantly more unclear referents than the N-children\(^3\) (Figure 13.10). With age

\(^{33}\) ANCOVA with the number of all unclear referent shifts as covariate; group effect $F(1,164)=37.01$, $p<0.0001$; No age or age*group interaction effect was observed (nine-year-old PI-children excluded).

\(^{34}\) In section 8.5.2 the number of embedded clauses produced by the N- and PI-children proved to be comparable.

\(^{35}\) ANCOVA with the mean total number of references as covariate; group effect $F(1,164)=16.62$, $p=0.001$; age effect ($F(4,164)=7.50$, $p=0.0001$); no age*group interaction effect was observed (nine-year-old PI-children excluded).
there is a linear decrease\textsuperscript{36} in the production of unclear referents in both groups, although at a higher rate in the N-children than in the PI-children.

\textbf{Figure 13.10} The percentage \textit{unclear referents} (calculated over all referents) per age group expressed by 75 normally developing children and 120 PI-children in conversation

![Figure 13.10](image)

We have the impression that there exists great individual variation within age groups and within the N- and PI-group: some children are doing far better than others. Therefore, we decided to look in more detail at the PI-children who produce extremely many \textit{unclear referents} (Table 13.10).

\textbf{Table 13.10} Distribution of the number of N-children per age-group (n=15) and the number of PI-children per age-group (n=20) and the total number and the percentage of N-children (n=75) and PI-children (n=120) categorized according to z-scores ≥ +1 and +2 on the variable \textit{unclear referents} in conversation

<table>
<thead>
<tr>
<th>Unclear referents</th>
<th>N-children n=75</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>z ≥ +1</td>
<td>z ≥ +2</td>
</tr>
<tr>
<td>4 yrs</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5 yrs</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>6 yrs</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7 yrs</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8 yrs</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>(8 %)</td>
<td>(9 %)</td>
</tr>
</tbody>
</table>

There are significantly\textsuperscript{37} more PI-children than N-children that produce extremely many \textit{unclear referents} falling in the marked category z≥+2. When we take both

\textsuperscript{36} ANCOVA (Polynomial contrast): N-children: age effect F(4,69)=9.59, p<0.0001; Linearity: p<0.0001; PI-children (nine-year-old PI-children included): age effect F(5,113)=6.95, p<0.0001; Linearity: p<0.0001; Cubic: p=0.012.)
marked categories ($\geq +1$ and $\geq +2$) together, we see that significantly more PI-children ($n=52$) than N-children ($n=13$) produce too many unclear referents. Thus, there are more individual PI-children than N-children that show a disability in the establishment of clear co-referential cohesion.

We observed that the introduction of brand-new entities with an indefinite NP in topic-position is no problem, neither for the N-children nor for the PI-children. They both have more problems with first mentions by means of definite NPs (e.g. proper name) and pronouns. Whereas the N-children learn to use these devices more clearly by age, the PI-children show the same development, although at a slower rate. Next, the PI-children produce significantly fewer too clear referent maintenances by means of a definite NP and significantly more unclear pronominal referent maintenances compared to the N-children. Moreover, the PI-children produce significantly fewer referent maintenances whereby more than one clause is produced between the antecedent and the referent as compared to the N-children. We argued that the PI-children are slightly delayed in the establishment of referent maintenance over a larger distance compared to the N-children. Furthermore, the PI-children's productivity of referent shifts is relatively low and comparable to that of the N-children, whereby the percentage unclear shifts is comparable in both groups. The PI-children have difficulties in establishing clear cohesive relations between language units by means of clausal ellipsis, the use of conjunctions and subjunctions, and by means of all types of co-referential cohesion compared to the N-children. We showed that these semantic/pragmatic difficulties in the PI-children were for a substantial part related to difficulties in the area of morphology/syntax. The PI-children frequently miscalculate the listener's informational needs and miss the right content to establish cohesion. In particular the PI-children are frequently also lacking the right linguistic morphological/syntactic form to establish clear cohesion (e.g. Johnston, 1985; Bishop and Adams, 1989). These difficulties are a good indication of a language disorder, predominantly in the area of semantics/pragmatics, although many of these cohesive difficulties are closely related to difficulties in the area of morphology/syntax. The PI-children gave the impression that, while they are in the process of learning to apply certain semantic/pragmatic rules, they were still suffering from not having developed the right morphological/syntactic tools to work with.

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37 Chi-square (after continuity correction) = 9.60, df = 1, $p<0.002$ (nine-year-old PI-children included).
38 Chi-square (after continuity correction) = 1.89, df = 1, $p<0.0001$ (nine-year-old PI-children included).
The ability to tell a narrative

Claudia Blankenstijn

14.1 Introduction

In the previous chapters, we analysed PI-children's semantic/pragmatic conversational abilities. We showed how contributions that were part of extended discourse with a narrative character can form a mini-narrative on their own (see 11.5). These results indicated that the PI-children produced as many narrative episodes compared to N-children, but in Chapters 12 and 13 it became clear that PI-children have difficulties in connecting contributions into coherent and cohesive mini-narratives within the conversation. For example, one of the PI-children's major problems proved to be giving non-ambiguous information (see 12.7). In the narrative genre, this problem should be minimized, since the PI-children are supposed to have more external control over the events they have to describe (see 3.2) since they follow the Frog story pictures (see Appendix 3a).

Narrative abilities are among the most important linguistic abilities for children to learn, since narratives are among the most widely used forms of organising human experience (Bruner, 1990). Through narratives, children learn to see experiences from a particular point of view, to sequence them in time and to connect them causally into a certain order (Labov and Waletsky, 1968; Bruner, 1990; Berman and Slobin, 1994) (see 9.1). We may expect some problems in the PI-children in this area, since they proved to have morphological/syntactic difficulties in telling the Frog story narrative. They not only frequently omit obligatory elements (see 9.2), but also have difficulties in expressing temporality (see 9.3) and in ordering linguistic information by means of morphological/syntactic packaging (see 9.5). Many PI-children do not produce the morphological, lexical and syntactic forms that are acquired quite early on by N-children and are prerequisites for describing individual events. The control of these forms is the first step in telling a narrative in the conversational (see 11.5) and narrative genre (see 9.7) (e.g. Berman, 1988). On the basis of these morphological/syntactic difficulties in the narrative genre we expect also to find problems in the semantic/pragmatic area.

Here, we want to know whether the PI-children are as good as the N-children in the ability to tell a narrative, giving the listener enough correct narrative information in order to enable the listener to imagine and visualize the plotline of the Frog story on the basis of what is narrated. This involves not only the embedding of the narrative in time (see 14.2), but also the coherent and cohesive linking of narrative contributions. We will explore this by considering what plot elements are coherently explicated (see 14.3) and what animate referents are cohesively and clearly referred to (see 14.4 to 14.8).

In general, N-children learn to use linguistic means to connect events into coherent structures related to three different levels. First, they begin at the level of the scene, when children give descriptions of only one picture that is they describe one or more characters in a certain situation or experiencing a certain event. Second, at the level of the episode, children give a description of one to three pictures: certain situations...
and events experienced by the characters are connected to each other. The situations and events might not only be related to each other in a linear chain of successive events located in space and time, but also be hierarchically ordered into causal relations. Third, at the highest level of the plot, not reached until seven/eight years of age, children narrate how all the depicted events are coherently, hierarchically and causally related to each other in the overall plotline intended by the author of the picture book (e.g. Piaget, 1959; Berman and Slobin, 1994; Peterson and McCabe, 1993; Roelofs, 1998).

From the developmental literature, we know that by age five N-children can describe events, whereas younger N-children describe frequently only objects or situations (Tolchinsky-Landsmann and Sandbank, 1995). Between age four and six, in general N-children stress the events themselves rather than the relations of time (order) and/or cause which unites them. The natural order is wrongly assumed to be known to the addressee. From age six on, the N-children are able to tell a more complete story, expressing not only the setting, search attempts and complication (see for a detailed explication 14.3), but also the Frog story outcome (Roelofs 1998). The events are related in time and sometimes even causally related, especially the search attempts. However, the idea of chance seems absent in eight-year-old N-children's narratives: every event is somehow connected, but nothing happens by chance (e.g. Piaget, 1959). These findings are in large comparable to earlier results of the narrative development of English-, German, Spanish, Hebrew and Turkish-speaking N-children (Berman and Slobin, 1994).

Generally, English-speaking LI-children are found to have difficulties in producing narratives (Crystal, 1987; Paul and Smith, 1993): they leave important facts unexpressed and incorporate non-related events like young four- and five-year-old N-children tend to do (McCabe and Rollins, 1994). Even older LI-children at the age of nine to eleven years are observed to be less effective in establishing coherent causal and cohesive referential relations between narrative events. Their stories are found to be structurally less complex (Merritt and Liles, 1989; McFadden and Gillam, 1996). In a pilot study on the narrative abilities of Dutch-speaking LI children (Verkoeijen, 1999) the existence of such problems were confirmed. However, little is known about the relative speed of the development of the ability to tell a narrative and the kind of semantic/pragmatic deficiencies shown in PI-children with different types of PI, although some findings point towards the existence of narrative difficulties in PI-children. For instance, English-speaking PI-children with ADHD (n=30; 7;0 to 11;0 years) were observed to have difficulties in retelling fictional narratives; they produced fewer plot elements than same-aged N-children (n=30; 7;0 to 11;0 years) (Tannock, Purvis and Schachar, 1993), although both groups did not differ in story comprehension. Cole (1997) confirmed these results: 19 English-speaking PI-children (all boys), with externalizing PI, rated as aggressive by their teachers, all produced less sophisticated Frog stories, for instance, fewer setting components (see 14.3.2) than same-aged N-children.

Tager-Flusberg (1995) found that autistic PI-children (excluded in this study) introduced characters in an ambiguous way, and had difficulties with producing the complete set of causally linked search attempts and the Frog story outcome. Tager-Flusberg and Sullivan (1995) also observed that autistic PI-children were less
The ability to tell a narrative

accurate in labelling internal responses that is the emotional response of a character to a situation (explained further below). Capps, Losh and Thurber (2000) observed that PI-children on the autistic spectrum were less likely to identify the causes of the main character's internal states than language matched N-children. These PI-children rather tended to simply label emotions and explain actions, being more restricted in the range of different linguistic devices used. In pilot studies on the narrative abilities of Dutch-speaking PI-children (Dijkhuis, 1994; Burger, 1995), and in a study of PI-children with ADHD (Velgersdijk, 2001) semantic/pragmatic difficulties in establishing clear coherence and (co-referential) cohesion were observed in most children.

Narrative task

The narrative topic of the Frog story is the search for a lost possession. This topic is supposed to be unproblematic in the assumption that most children will be familiar with a similar event in real life, (Berman and Slobin, 1994:40). The narrative task probably is, however, a relatively more complex task than the production of conversational mini-narratives for two reasons (e.g. Karmiloff-Smith, 1986; Ninio and Snow, 1996; see 11.5). First, as a narrator the child must adopt the main character's perspective (Trabasso and Rodkin, 1994). This language ability is based on the social-cognitive ability to take someone else's point-of-view, being part of children's Theory-of-Mind (Perner, 1991; Sanders, 1994; Wellman, 1992; see 2.3.3). To take and express one owns perspective, as is mostly the case in the conversational interview genre (see 11.5), is supposed to be easier and therefore probably learned earlier. Second, picture sequences impose a particular kind of cognitive demand by requiring children to translate static visual input into verbal output. To make cognitive non-static representations on the basis of static material is a social-cognitive ability also part of the Theory-of-Mind (Perner, 1991) (see Appendix 3a).

What is narrated depends on children's language capacities and their understanding of the story. There can be a discrepancy when they understand more than they can actually express. Despite this possible discrepancy, many researchers trace underlying social-cognitive developmental patterns on the basis of linguistic output (Trabasso and Nickels, 1992; Trabasso, Stein, Rodkin, Munger and Baughn, 1992; Trabasso and Rodkin, 1994). Specific parts of children's Theory-of-Mind can be inferred from how they communicate (Bretherton, 1991). Assuming that narrative skills provide insight into linguistic and social-cognitive skills, researchers have recently begun to analyse narratives as a means of investigating atypical social-cognitive development in PI-children (Capps, Losh and Thurber, 2000:193).

A good Frog story narrative is characterized by one long turn of the child, and all communicative contributions are related to the narrative, the so-called narrative contributions. As we already mentioned, N-children are still developing this ability between four and eight years (Roelofs, 1998). In populations of LI-children, especially in LI-children with pragmatic disorders, it has been frequently observed that they have problems with the production of longer turns (McTear, 1985). In a
pilot study on the narrative abilities of Dutch-speaking LI-children (Verkoeijen, 1999), it was confirmed that LI-children needed more feedback from the investigator. These children seem to have problems with constructing an autonomous narrative without the interlocutor's queries and prompts.

We might therefore also expect difficulties in the PI-children in focussing on the narrative task. This is indeed what we found. We counted all narrative contributions calculated over all communicative contributions (see 10.2) elicited with the picture book. The percentage narrative communicative contributions was significantly lower in the PI-children than in the N-children. Even older PI-children show more task digression than younger N-children, expressing irrelevant personal associations. The PI-children thus seem to have some attention problems in focussing on the narrative task.

Although the PI-children produce more narrative contributions with age (86% to 98%), no linear increase was observed in the PI-children as opposed to the N-children (90% to 99%) (Roelofs, 1998: 140). However, the actual number of codable narrative contributions expressed per Frog story in Dutch was on average 48 in both N- and PI-children (range 40 to 55) (see 9.2.1 and 9.2.1 for the story length measured in clauses). These were mostly simple T-units and a few complex T-units with one subordinate clause. The number of narrative contributions proved to be stable over time, as no significant main effects were observed, although with age the number of clauses did increase in the PI-children (see 9.2.2). The 120 Dutch-speaking PI-children did not tell significantly shorter stories than the N-children, in contrast to what has been observed in English-speaking autistic PI-children (Tager-Flusberg, 1995).

Here we are interested in qualitative differences in performance between the N- and PI-children (see Table 14.1). Therefore, we explored the ability to embed a narrative in time, and compare the PI-children with the N-children (see 14.2). Next, we will look in more detail at the ability to narrate the most important plot components, following the analysis of Trabasso, Van den Broek and Suh (1989) and Trabasso and Rodkin (1994) (see 14.3). A plot line narrated in full contributes positively to the coherence of the narrative. As in the analysis of the conversational interview, we looked at the ability to use co-referential cohesive devices (14.4), for referent introductions (14.5), referent maintenances (14.6) and referent shifts (14.7). Finally, we will make some concluding remarks with respect to the ability to establish co-

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1 ANCOVA with the number of communicative contributions as covariate: group effect F(1,164)=4.07, p<0.045; age effect F(4,164)=34.53, p<0.001; age*group interaction effect F(4,164)=6.06, p<0.0001 (nine-year-old PI-children excluded).

2 One way ANCOVA with the number of communicative contributions as covariate; significant linear increase of narrative contributions observed (p<0.0001).

3 The number of codable narrative contributions of Dutch-speaking N- and PI-children proved to be most comparable to the number of narrative contributions (clauses) of German-speaking children, being slightly higher than the number of narrative contributions of Spanish, Hebrew and Turkish-speaking children (Berman and Slobin, 1994:31). However, Dijkhuis (1994) found more variation in Dutch-speaking PI-children (range 23-66 narrative contributions) and a lower mean of 39 narrative contributions.
The ability to tell a narrative referential cohesion in a narrative as compared to the conversation (14.9) and the ability to tell a coherent narrative (14.10).

Table 14.1 The complete set of semantic/pragmatic narrative variables

<table>
<thead>
<tr>
<th>Structure</th>
<th>Form - Function - Content</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Embedding narrative in time</strong></td>
<td>Narrating the Plot</td>
</tr>
<tr>
<td>story begin</td>
<td>Setting</td>
</tr>
<tr>
<td>story end</td>
<td>Initiating Events</td>
</tr>
<tr>
<td></td>
<td>Search Attempts</td>
</tr>
<tr>
<td></td>
<td>GOA-units</td>
</tr>
<tr>
<td></td>
<td>Internal Responses</td>
</tr>
<tr>
<td></td>
<td>Outcome</td>
</tr>
<tr>
<td></td>
<td>Co-referential cohesion</td>
</tr>
<tr>
<td></td>
<td>referent introduction</td>
</tr>
<tr>
<td></td>
<td>referent maintenance</td>
</tr>
<tr>
<td></td>
<td>referent shift</td>
</tr>
</tbody>
</table>

In the next sections each of these variables will be defined and motivated in detail.

14.2 Embedding a narrative in time

14.2.1 Research questions, definitions and operationalisations

As pointed out before (see 9.3) temporality is an important factor in the organisation of narrative structure with respect to anchoring tense. Pinpointing the narrative on an abstract time-line is related to the social-cognitive ability to (pre)plan the narrative text as a whole and to the ability to take into account the listener's need by providing a clear start and endpoint to the story (Berman, 1988; Berman and Slobin, 1994). As explained earlier (see 9.3), we therefore adopt two basic notions following Reichenbach (1947). He distinguished the speech time (S): the time the child speaks in the actual here-and-now and the reference time (R): the abstract timeline to which is referred narrating the Frog story. Fulfilling the task of telling the Frog story, children must cognitively go from the actual time of being and speaking to the abstract time-line of the story and back again (Aksu-Koç and Von Stutterheim, 1994).

Among the first who analysed this type of narrative time embedding were Applebee (1978), Sutton-Smith (1979), Hudson, Gebelt, Haviland, and Bentivegna (1992). More recently, it is reported that the development of this ability starts at age three/four in Hebrew and English-speaking N-children and is not finished before the age of nine (Berman and Slobin, 1994; Berman, 1996). Here, we want to answer whether the embedding of narratives in time by means of a clear start and endpoint by the PI-children is comparable to the embedding by the N-children. And, is there comparable development with age?

Following Berman (1996), a narrative discourse analytic model was developed (Roelofs, 1996; Roelofs, 1998:137) in order to explore the ability to embed a
Chapter 14  Semantic/Pragmatic narrative development

narrative in time that is content sensitive for Dutch. Only correct instances of a subset of variables were counted, as defined in the following.

The start of the Frog story can be marked in four different ways in Dutch by the use of

(1) **stereotype expression**, such as 'er was eens....' (once upon a time...) or 'dit is een verhaal over....' (this is a story about ...)
(2) **adverbs of place**, such as 'er is...'/ 'd'r zijn...' (there is/are ....) or **adverbs of time**, such as 'eens...' (once....) or 'het is avond...' (it is evening)
(3) a **tense shift from present to simple past/perfective.**

The morphological tense marking on verbs used for the actual speech time (S) is the present as opposed to the tense marking on the first verb used in the reference time (R) of the Frog story. This is the simple past and perfective (e.g. Moerman-Coetsier en Van Besien, 1987) (Example 1).

Example 1  Start expressed by means of a stereotype expression and a tense shift (PI-child; age 8;0)

Interviewer:  
je mag nu beginnen met vertellen.
(you can now start the narrative)
Jordi:  
er was eens een jongetje.
(once upon a time there was a boy)

In Example 1, the actual speech time (S) before the PI-child starts the story is present 'mag' (can). The PI-child correctly uses the simple past 'was' (was) on the first verb in the Frog story reference time (R).

The end of the Frog story can be marked in three different ways in Dutch by the use of:

(1) **stereotype expression**, such as 'en ze leefden nog lang en gelukkig' (and they lived happily ever after)
(2) **done expressions** such as 'uit' or 'klaar' (done/ I have finished)
(3) **tense shift from simple past/perfective to present.** The morphological tense marking on the last verb used in the reference time (R) of the Frog story then is the simple past/perfective and the tense marking on the verb used to close the story is the present (Example 2).

Example 2  End expressed by expressions such as 'done' and a tense shift (PI-child; age 8;0)

Natascha:  
het jongetje nam hem mee naar huis.
(the boy took him home)
Natascha:  
en toen is het verhaal uit.
(and then (past) the story is ended)

In Example 2, the PI-child used 'nam' (took) that is the simple past form of the verb 'nemen' (to take) to refer to the reference time (R) and 'is' (is) that is the present tense marking for the verb 'zijn' (to be) to refer to the actual speech time (S). This
The ability to tell a narrative example also shows an erroneous agreement between the adverb of time and the morphological tense marking on the verb (see 7.2 and 9.3). Failure to mark the beginning and end of the Frog story means that the child just starts talking and the story finishes with the last narrative contribution or the child just closes the picture book.

14.2.2 Results: Embedding a narrative in time
From Figure 14.1, it is obvious that there are significantly fewer PI-children (mean 32%) than N-children (mean 57%) that mark the start but there are a comparable amount of PI-children (mean 64%) and N-children (mean 70%) that mark the Frog story end. As could be expected on the basis of the developmental literature (e.g. Hudson et al., 1992; Sutton-Smith, 1979; Berman, 1996), the ability to mark the story beginning starts to develop at age four in the N-children but at age six/seven in the PI-children. Significantly more older PI-children than younger PI-children express the story beginning (see also Roelofs, 1998:143). The development to mark the story end starts at age four in both N- and PI-children. With respect to this ability no significant main effects were observed. Although it was not coded or analysed, the PI-interviewers' style to wait and look at the PI-child for a story end marking to come, might have influenced the behaviour of the PI-children positively.

Figure 14.1 Percentages of N-children (Roelofs, 1998) and PI-children per age group that express the start at the end of the Frog story

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4 As opposed to the analysis of Roelofs (1998) the expression of the outcome of the Frog story is not coded as 'marking the story end'.
5 Chi square (ldf; after continuity correction) = 7.80, p<0.0001.
6 No age effect was observed using the Mantel-Haenszel Chi square test for linear association.
7 Mantel-Haenszel Chi square test for linear association; 1 df = 22.61, p < 0.001.
From Table 14.2 we see that N-children more often mark the start of the Frog story with a tense shift (T) (total mean 36%) than with a stereotype expression (S) (total mean 21%). This difference is not found in the PI-children. The numbers of PI-children that use tense (T) and stereotype expressions (S) to mark the story beginning are both low. Significantly more older than younger PI-children start the story by means of stereotype expression (S). No age effect was observed in the N-children, because relatively many five-year-old N-children expressed stereotype expressions (S) compared to the other age groups within the N-population. From Table 14.2 we also see that the end of the Frog story is marked by more N- and PI-children with a tense shift or an expression such as 'done' (T/D) (total mean N-children: 67%; PI-children: 64%) than with a stereotype expression (S) (total mean N-children: 3%; PI-children: 0%). No significant group effect was observed. There is a significant age effect in the use of tense shift and/ or expression such as 'done' (T/D) to mark the end of the Frog story.

Table 14.2

<table>
<thead>
<tr>
<th>Embedding narrative in time</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>opening</td>
<td>end</td>
</tr>
<tr>
<td></td>
<td>Tot S T</td>
<td>Tot S T/D</td>
</tr>
<tr>
<td>4 yrs</td>
<td>0.27 0.07 0.20</td>
<td>0.47 0.00 0.47</td>
</tr>
<tr>
<td>5 yrs</td>
<td>0.67 0.20 0.47</td>
<td>0.80 0.00 0.80</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.46 0.13 0.33</td>
<td>0.87 0.00 0.87</td>
</tr>
<tr>
<td>7 yrs</td>
<td>0.66 0.13 0.53</td>
<td>0.67 0.00 0.67</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.80 0.53 0.27</td>
<td>0.66 0.13 0.53</td>
</tr>
<tr>
<td>Total</td>
<td>0.57 0.21 0.36</td>
<td>0.70 0.03 0.67</td>
</tr>
<tr>
<td>9 yrs</td>
<td>- - -</td>
<td>- - -</td>
</tr>
</tbody>
</table>

Roelofs (1998:143) reported that a relatively high number of seven-year-old N-children expressed no end, but expressed the story outcome instead (Roelofs, 1998:143). Only two eight-year-old N-children used the stereotype expression equivalent to the English 'and they lived happily ever after...'; but none of the PI-children did.

14.2.3 Conclusion: Embedding a narrative in time

We conclude that significantly fewer PI-children, mainly the four- and five-year-olds, mark the story beginning compared to the N-children. An equal amount of N-
and PI-children mark the story end, mostly with a tense shift and relatively infrequently with a stereotype expression. Especially the young PI-children show some difficulties in marking the story beginning in order to pinpoint the narrative on an abstract time-line. Older PI-children seem to have acquired the same social-cognitive or meta-linguistic skills as the N-children to (pre)plan the narrative text as a whole. Older PI-children thus take into account the listener's need by providing a clear start and endpoint to the story.

14.3 The ability to narrate the plot

14.3.1 Research questions, definitions and operationalisations

The plot is an abstract schema for the organising of a story. Labov and Waletsky (1967) showed that the plot has a structure that contains an onset, unfolding and a resolution. Mandler and Johnson (1977) and Stein and Glen (1979) use the terms setting and episodes. The setting specifies the characters and the space and time in which the story events take place. An episode is structured around a goal-directed action and outcomes, and these actions and outcome within one episode together can form a mini-plot. Stein and Glen (1979) also described how events in a narrative can be related by temporal, logical and causal relations. These ideas about the plot are incorporated in the causal network model of Trabasso and colleagues (1989), Trabasso and Nickels (1992) and Trabasso and Rodkin (1994). They all focus on the causal relations between narrative events, called planning components. In order to evaluate the content of all N- and PI-narratives, we developed a narrative discourse analytic model that is sensitive for Dutch, largely based on the causal network model of Trabasso and Rodkin (1994). Using this model we can explore coherence in the narratives of both N- and PI-children.

It can be assumed that coherence is achieved by the causal linking of narrative contributions that contribute to the plot. There can be a discrepancy between what can be causally and thus coherently linked by children and what children understand about causality. This understanding is part of the development of their Theory-of-Mind (see 2.3.3), which concerns a theory about psychological and physical causation (Kemper, 1984). It is especially the knowledge about goal plans of action (Trabasso and Nickels, 1992) that underpins the ability to narrate the planning components that are part of the overall plot (see Table 14.2).

In sum, the analysis of N- and PI-children's expression of the amount of planning components is globally indicative for their ability to narrate a causally related plot-line. N-children become better in doing so with age. They also become better in explicitly marking the causal relations between narrative contributions, as, for instance, the results from Spanish-speaking N-children (4;0 tot 8;11 years) show (Guttierrez-Clellen and Iglesias, 1992). In Table 14.3 we present the planning components and their coding. When these are causally and coherently linked, this contributes greatly to the quality of the Frog story narrative.
Table 14.3 The coding categories of all 19 planning components for Dutch (based on Trabasso and Rodkin, 1992) (see Appendix 3a)

<table>
<thead>
<tr>
<th>19 Planning Components</th>
<th>Setting</th>
<th>Initiating events</th>
<th>Search attempts</th>
<th>Outcome/2</th>
<th>Internal response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting</td>
<td>1. introduction frog</td>
<td>3. boy asleep</td>
<td>10. boy searches frog in room</td>
<td>17. boy finds the frog! *a (mother) frog/ the frog and other frog(s)</td>
<td>19. boy is happy</td>
</tr>
<tr>
<td></td>
<td>2. boy possesses frog</td>
<td>4. frog leaves jar</td>
<td>11. boy calls frog out of window</td>
<td>18. boy retrieves the frog/ a (mother) frog/ *the frog and other frog(s)</td>
<td>19. boy is happy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. boy awakes</td>
<td>12. boy searches frog outside</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. boy finds jar</td>
<td>13. boy searches frog in hole in ground</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. jar is empty</td>
<td>14. boy searches frog in hole in tree</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. frog is gone</td>
<td>15. boy calls frog from rock</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>16. boy searches frog behind log</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

We will now explain the causal relations between the different planning components. Following Trabasso and Rodkin (1994) we adopt the view that the plotline that has to be narrated by the children reflects a hierarchical network of goals that the main character has in mind. This underlying internal (pre)plan of the main character then is the basis of and is causally related to the actions the main character undertakes.

First, the children have to give some general information about the main characters (setting; see Table 14.3) and give some background information about time and place, and the initiating circumstances (initiating events; see Table 14.3).

Second, when the frog disappears and the boy feels sad about this (internal response; see Table 14.3), this emotion of sadness is turned into an emotion of desire. This emotion underlies not only the highest goal (1), i.e. that the boy wants to retrieve the frog, but since causally motivates a goal plan of actions (2), i.e. the boy plans to find his frog back. Good narrators will incorporate the two internal feelings (9 and 19; Table 14.3). This ability reflects the ability to take a different perspective then your own, being part of the Theory-of-Mind (see 2.3.3). Children younger than nine years of age mostly are not explicit about this part of the story, since it is too

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11 The two initiating events boy finds jar and jar is empty are only one initiating event in the model of Trabasso and colleagues (1992).
12 The overall outcome of the plot is worked out in detail contrary to the model of Trabasso and colleagues (1992).
The ability to tell a narrative

difficult for them to talk about the inner motives of main characters (e.g. Piaget, 1955; Berman and Slobin, 1994).

Third, children then have to narrate how the boy works out his internal plan. Children have to narrate the search attempts on different locations the boy undertakes to find his frog (see Table 14.3). From age four on, N-children can narrate these events in a rather global manner. With age, they learn to narrate about the search attempts in more detail, giving more background information (Roelofs, 1998; Berman and Slobin, 1994).

Fourth, children have to learn to express explicitly that many of the main-character attempts (search attempts; Table 14.3) fail. The boy thereafter internally reinstates the search goal (1) and the motivation (2) to attempt once more to find the frog. The narrated search attempts and their failure can form a mini-narrative within the overall narrative. When the Action of a search attempt, its Location, the Goal of the search attempt (the frog) and its Outcome (successful or not) are all explicitly narrated, this forms a narrative Goal-Action-Outcome unit (see 14.3.4 for more details). Only half of the eight-year-old Dutch-speaking N-children are capable of expressing this (Roelofs, 1998). This finding confirmed earlier results (Trabasso and Rodkin, 1994).

Finally, the lost object is found by the boy and goal 2 is reached (Outcome 17; Table 14.3). Then the lost object is taken home and goal 1 is reached (Outcome 18; Table 14.3). The main-character's internal goals 1 and 2 which are established in the beginning of the story are strongly hierarchically and causally connected to outcome 18 and 17 at the end of the story. When the goals are reached, the boy therefore looks and is happy (internal response; Table 14.3).

Unfortunately, the picture book leaves room for speculation; that the boy gets his lost frog back is not that clear. The boy also finds, sitting next to his own frog, another frog and little frogs; it is not clearly depicted which one the boy takes home. Children thus can narrate this part of the Frog story in many different ways. Some options are coherent with the pictures and the overall plot, whereas others are not. These incorrect outcomes are marked with an asterix * (see Outcome 17 and 18; see Table 14.3). From the developmental literature, we know that two thirds of the four-year-old and most five-year-old N-children can express one of the two Frog story outcomes (Roelofs, 1998). This finding confirmed earlier reports (Trabasso and Rodkin, 1994).

Narrative contributions were coded as planning components only if they fulfilled certain conditions. Firstly, the state of affairs (Dik, 1989) had to be explicitly expressed by the narrator. It had to contain the subject/thematic agent and the verb that expressed a situation or action. This was defined for Dutch by Blankenstijn (1996), based on Trabasso and Rodkin (1994). Secondly, the narrative contributions had to be expressed in direct relation to the picture depicting that planning component. In the narrative eliciting method (see 3.3) the child tells the story while leafing through the book. Thirdly, the contributions had to reflect the main character's point-of-view, namely that of the boy (Trabasso and Nickels, 1992; Trabasso and Rodkin, 1994).
Accordingly, we counted how many narrative contributions express a planning component as part of the overall story plot line (see Table 14.3). When children express all 19 planning components, the story is qualitatively a good story. The children then show that they are able to coherently link narrative contributions in a causal-logic hierarchy and the listener is able to understand what the Frog story is about.

On the other hand, when children express too few planning components it is not possible to understand the complete plotline. Too few narrated planning components indicate a disability in expressing causality, and therefore might be very indicative for a language disorder in the area of semantics/pragmatics (e.g. Bishop, 2002). We formulated the following research questions: is the number of planning components expressed by the PI-children comparable to the amount expressed by the N-children? And, is there comparable development with age?

In order to make our results comparable to those of others, we followed Trabasso and Rodkin (1994:100, Table 14.3) by presenting the results in terms of the percentage of narrators in each age group who include (parts of) the search attempts, such as its location, goal (purpose) and outcome, in narrating the Frog story. The planning components will be discussed according to type. We start with the exploration of the ability to express the Frog story setting (14.3.2), followed by the ability to express initiating events (14.3.3), search attempts (14.3.4), internal responses (14.3.5), and the Frog story outcome (14.3.6), ending with some concluding remarks about the ability to narrate the plot in general (14.3.7).

### 14.3.2 Setting
The setting consists of two parts. The narrator must mention that there is a frog (1) (Example 3), and that the boy possesses the frog (2) (Example 4) (see Figure 14.2).

**Example 3**  
_the frog is introduced (PI-child; age 8;11)_

Kirsten: het gaat over een jongetje.  
(it is about a boy)
Kirsten: en <eh> zit op een krukje.  
(and <eh> sit on a stool)
Kirsten: en er is een hondje.  
(and there is a dog)
Kirsten: en het hondje kijkt <in een eh> in een glazen ### bak.  
(and the dog looks <in a eh> in a bowl)
Kirsten: en er zit een kikker in.  
(and there is a frog sitting in it)

**Example 4**  
_the boy possesses the frog (PI-child; age 8;11)_

Miranda: "wat lief hé de kikker die we hebben gevangen bij de sloot?  
(what sweet, isn’t it, the frog that we caught near the ditch?)
Paraphrasis: de boy says to the dog: "isn’t he sweet, isn’t it, the frog that we caught near the ditch?"
We observed that the introduction of the frog is the easiest part of the Frog story for both N- and PI-children. Most N-children (mean 93%) and PI-children (mean 98%) give expression to this part (see Appendix 14; Table 14a). Although we expected some problems in this area, since PI-children with externalizing PI are observed to express significantly fewer setting components than N-children (Cole, 1997), no main effects\(^{13}\) were observed, since most N- and PI-children introduce the frog (planning component 1; Table 14.3). Children not only must remember the content of the end of the story, but also the plot structure when they start narrating. If narrators express that the boy possesses the frog (Figure 14.2), at the beginning of the narrative, they show that they are able to present the narrative as a whole. The fact that the boy wants to get his frog back is then more explicitly motivated.

From Figure 14.2 we see that the four-year-old N- and PI-children are not able to express the fact that the boy possesses the frog (see also Roelofs, 1998:140). We observed that significantly\(^{14}\) more older than younger N-children and PI-children express this plot element (i.e. planning component 2; Table 14.3). This ability increases from age four but the strong improvement seems to start at age seven in the N-children and later with the PI-children. Both groups still have to develop considerably in this aspect after age eight. Thus, in general the ability to produce the first planning component (introduction frog) is already developed in most four-year-old N- and PI-children but the second component (possession frog) is not produced by N- and PI-children as a group until after eight/nine years of age.

---

\(^{13}\) According to the Pearson's Chi-square no group effect was observed. According to the Mantel-Haenszel Chi square test for linear association no age effects are found.

\(^{14}\) Mantel-Haenszel Chi square test for linear association (1 df)= 25.37, \(p < 0.001\).
14.3.3 Initiating events
The initiating events are analysed into six parts: boy asleep (3), frog leaves jar (4), boy awakes (5), boy finds jar (6), jar is empty (7) and frog gone (8) (see Table 14.3) (Example 5).

Example 5  Expression of initiating events (Pl-child; age 8;10)
Christiaan: dat jongetje zit te slapen.
(that boy is sleeping)
%cod: boy asleep
Christiaan: en die kikker probeert gluipend [?] uit het potje te lopen.
(and that frog tries sneakily[?] to climb out of the jar)
Paraphrasis: (and that frog tries to sneak out of the jar)
%cod: frog leaves
Christiaan: en die hond die zit nou bij het jongetje.
(and that dog that is sitting now next to the boy)
Christiaan: en dat jongetje dat schrikt zich dood
(and that boy he is startled)
Christiaan: de kikker is weg.
(the frog is gone)
%cod: frog gone

We first computed the percentage of N- and PI-children per age group that narrated each initiating event (see Appendix 14; Table 14b). In Figure 14.3, we present the percentage of N- and PI-children that narrated all initiating events.

Figure 14.3 Percentage of N-children (n=15 per age group) and PI-children (n=20 per age group) that express all initiating events

There is no significant difference\(^{15}\) between the two groups. This is possibly due to the relatively low performance of the five-year-old N-children of which none expressed that the boy finds the jar (see Appendix 14; Table 14b).

\(^{15}\) According to the Pearson's Chi-square no group effect was observed.
The ability to tell a narrative

The older N- and PI-children produce significantly\(^{16}\) more *initiating events* than the younger N-children (see also Roelofs (1998:141) and PI-children. We checked whether the most important initiating events *frog leaves* and *frog gone* are expressed by an equal number of PI-children and N-children, since these scenes are the background to all the subsequent search attempts; this proved indeed to be the case; no significant group effect\(^{17}\) was found.

However, there still may be PI-children who produce not enough initiating events for their age. In Table 14.4, we present how many individual N- and PI-children produce not enough initiating events, largely based on cut-off points that are, in turn, based on age-related \(z\)-scores \((z \leq -2)\)\(^{18}\) (Table 14.4).

\[Table 14.4 \quad \text{Number of N-children and PI-children that are deviant on computed cut-off points per age group (largely based on } z \leq -2) \text{ with respect to the number of *initiating events* (with a maximum of 6)}\]

<table>
<thead>
<tr>
<th>Initiating events expressed</th>
<th>N-children (n=75)</th>
<th>Max (n=15)</th>
<th>PI-children (n=120)</th>
<th>Max (n=20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 yrs (\leq 2)</td>
<td>0 2 4 -</td>
<td>0 1 6 -</td>
<td>0 2 3 -</td>
<td>0 2 3 -</td>
</tr>
<tr>
<td>5 yrs (\leq 2)</td>
<td>0 2 3 -</td>
<td>0 2 7 -</td>
<td>0 2 3 -</td>
<td>0 2 3 -</td>
</tr>
<tr>
<td>6 yrs (\leq 3)</td>
<td>0 0 1 2 -</td>
<td>0 2 3 -</td>
<td>0 0 1 2 -</td>
<td>0 2 3 -</td>
</tr>
<tr>
<td>7 yrs (\leq 3)</td>
<td>0 0 1 3 -</td>
<td>0 0 2 4 -</td>
<td>0 0 1 3 -</td>
<td>0 0 2 4 -</td>
</tr>
<tr>
<td>8 yrs (\leq 3)</td>
<td>0 0 1 1 -</td>
<td>0 0 1 4 -</td>
<td>0 0 1 1 -</td>
<td>0 0 1 4 -</td>
</tr>
<tr>
<td>9 yrs (\leq 4)</td>
<td>- - - -</td>
<td>- - - -</td>
<td>- - - -</td>
<td>- - - -</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>20 (27%)</strong></td>
<td><strong>49 (41%)</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There are significantly\(^{19}\) more PI-children \((n=49)\) than N-children \((n=20)\) that express not enough *initiating events* according to their age. There are even more PI-children that express extremely few initiating events: 2 PI-children express no initiating events at all; 5 PI-children express only 1 initiating event; 18 PI-children express only 2 initiating events. Thus, 25 (21\%) PI-children in total as opposed to only 14 (18\%) mainly younger N-children express only 0 to 2 initiating events. Especially the four-, five- and nine-year-old PI-children had difficulties in describing what they see on the two pictures that depict the six initiating events. These PI-children sometimes express other less important things, some of which can be seen on the pictures and some not. This is background information (Example 6).

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\(^{16}\) Mantel-Haenszel Chi square test for linear association \((1 \text{ df}) = 31.39, p < 0.0001\).

\(^{17}\) According to the Pearson's Chi-square no group effect was observed.

\(^{18}\) This analysis is based on the following cut-off points per age group: when four- and five-year-old children produce less than 3 initiating events, when six- to eight-year-old children produce less than 4 initiating events and when nine-year-old children produce less than 5 initiating events, these children express too little initiating events according to their age.

\(^{19}\) Fisher's Exact, \(df=1\) (2-sided) = 4.51, \(p<0.04\).
Since six initiating events are elicited by only two pictures, the 41% of all PI-children might wrongly presuppose that one narrative contribution per picture is sufficient and gives the interviewer enough information to come to a correct understanding. The minimal linguistic performance reflects that PI-children follow the wrong semantic/pragmatic rule 'say as little as possible' in the narrative genre. This finding is comparable to the same tendency as observed in the conversational interview genre. There, the PI-children significantly leave more obligatory grammatical elements unexpressed (Chapter 5), express significantly more minimal responses (see 11.3) and significantly more frequently violate the Maxim of Quantity: too little information (see 12.5).

14.3.4 Search attempts
There are seven search attempts: boy searches frog in room (10), boy calls frog out of window (11), boy searches frog outside (12), boy searches frog in hole in ground (13), boy searches frog in hole in tree (14), boy calls frog from rock (15) and boy searches frog behind log (16) (see Table 14.3). These seven attempts form the major part of the Frog story.

In order to give the listener enough coherent and relevant information about the planning components the location, the goal, also called purpose (Trabasso and Rodkin, 1994) and the outcome of the seven search attempts needs to be explicitly narrated, following Grice’s principle (1975) of being informative (see 12.5). This information is semantically/ pragmatically obligatory information. When this information is expressed by the children, the intelligibility of the Frog story will improve. However, the search attempts and their location, goal or outcome do not have to be expressed in one single narrative contribution. In general children need more successive narrative contributions to do so (Table 14.5).

Table 14.5 The coding categories with respect to the analysis of search attempts

<table>
<thead>
<tr>
<th>Search attempts</th>
<th>Figure 14.4</th>
<th>Figure 14.5</th>
<th>Figure 14.6</th>
<th>Figure 14.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>- location*</td>
<td>+ location</td>
<td></td>
<td>+ result</td>
<td>- result*</td>
</tr>
<tr>
<td>- goal*</td>
<td>+ goal</td>
<td>- result*</td>
<td>+ result GAO-unit</td>
<td></td>
</tr>
</tbody>
</table>

* Incoherently expressed search attempts
As mentioned above (see 14.3.1), each search attempt (and the failure) forms a mini-narrative within the overall narrative. When the Action of a search attempt (verbs for searching, looking, calling and so on), its Location (e.g. room, hole in tree etc.), the Goal of the search attempt (the frog) and its Outcome (successful or not) are all explicitly narrated, this forms a narrative Goal-Action-Outcome unit (see Table 14.5). In the following, we will explain our method of analysis in order to judge the coherency of the expressed search attempts.

First, we only scored search attempts when they were expressed in direct relation to the picture depicting that search attempt. The following examples are all related to plot component 14: the boy looks into a hole in a tree in order to find the frog, but finds an owl instead (see Table 14.3) (picture 14) (see also Appendix 3a). When children only give some background information (Example 7), no search attempt can be scored.

**Example 7**
No search attempt expressed (PI-child; age 5:3)

Catrien:  
en dan komen opeens alle bijen er weer uit.  
(and then suddenly all the bees fly out)

In contrast to Trabasso and Rodkin (1994), we counted all search attempts even when their location was not expressed explicitly. This was scored as +search attempt -location - goal - outcome (Example 8).

**Example 8**
+search attempt -location [goal -outcome] (PI-child; age 7:8)

Bas:  
en toen keek de jongen  
(and then the boy looked)

Paraphrasis:  
and then the boy looked in the hole in order to find the frog, but found an owl instead

Second, when children express a location (room, window, outside, hole in ground, hole in tree, rock and log), this was scored as +search attempt +location [+/- goal +/-outcome] (Example 9).

**Example 9**
+search attempt +location [goal -outcome] (PI-child; age 5:2)

Child:  
en toen keek de jongen in de holletje  
(and then the boy looked in the hole)

Paraphrasis:  
and then the boy looked in the hole in order to find the frog, but found an owl instead

From Trabasso and Rodkin (1994:100) we know that adults nearly always express the exact location of each of these 7 search attempts. The locations form the mental space (Hendriks, 1993; Sanders, 1994) of the Frog story, i.e. the mental location in which all the events take place. However, N-children from four to eight/nine years seem to have difficulties in providing the listener with this information (Berman and Slobin, 1994; Trabasso and Rodkin, 1994; Helle, 1998).
Third, when the children express the goal of the search attempt, i.e. the frog or finding the frog, this was scored as +search attempt +/-location +goal +/-outcome (Example 10).

**Example 10**

+search attempt -location +goal [-outcome] (PI-child; age 5;8)

Jesse:  
<gaan> de jongen gaat kijken of de kikker daar zit  
(<go> the boy is looking if the frog sits there)

In Example 10, the child expresses the goal but does not specify the location. He says only ‘daar’ (there), a 'light adverb', that contains too little specific information and thus remains semantically vague. This therefore has to be scored as -location. In the conversational interview genre light adverbs were counted as jumps (see 12.3).

When children leave the goal unexpressed and implicit, they give the impression that the boy is looking for something else or not searching at all. To express the theta role (e.g. Dik, 1989) +goal is thus semantically/pragmatically obligatory information. N-children seem to be able to express goals in relation to search events before age four (Clark and Clark, 1977).

Morphologically/syntactically, however, it is optional to express the goal. The goal, 'the frog'/ 'for the frog' is usually expressed in the object or indirect object. In Dutch the goal is usually expressed with a direct object, such as in 'hij zoekt de kikker'. But the sentence 'hij zoekt Ø overal' (He searches Ø everywhere) with no overt goal/direct object remains grammatical in Dutch. The goal/direct object is therefore said to be optional, when the referent of the search attempt is clear (see also 8.6). In contrast in English, the goal is mostly expressed by means of an indirect object, such as in 'he looks for the frog'. It is not possible to leave the object of the preposition unexpressed. This verb might therefore trigger the explicitation of the goal in English in contrast to Dutch.

Possibly, the morphological/syntactic difficulty to express the (in)direct object, as some PI-children are observed to have in the conversational interview genre (see 5.4), also causes this semantic/pragmatic obligatory information to remain unexpressed in the narrative. In the Frog story, it can also be rather difficult for children to make the goal explicit in words, since the goal remains implicit on the pictures, as the lost frog is not to be seen until the end.

Finally, the narrator explicitly has to mention whether the boy did or did not succeed in finding the frog, called the outcome of a search attempt. When children express the outcome this was scored as +search attempt +/-location +/-goal +outcome (Example 11).

**Example 11**

+search attempt -location -goal +outcome (PI-child; age 5;5)

JanWillem:  
de jongen keek daarin.  
(the boy looked in it (?)).

JanWillem: → maar daar was de kikker ook niet.  
(but the frog was not there either).
In Example 11, it is not clearly expressed where the boy is searching, but in the last narrative contribution the outcome of the search attempt is explicitly expressed with the word 'ook niet' (not either). The narrator makes clear that the boy is continually looking for the frog. The goal is thus implicitly mentioned, but not explicitly, and is coded as -goal.

If a child explicitly expresses the search attempt +location +goal +outcome, this is coded as a Goal-Action-Outcome unit (Trabasso and Nickels, 1992) (see 9.4.1). GAO-units are complete expressions of search attempts and can form a mini plot on their own. If children express GAO-units they give the listener sufficient, coherent, causally linked and thus relevant narrative information to understand the story. Thus, the number of GAO-units in one narrative is a measure of complexity, reflecting sophisticated semantic/pragmatic narrative skills.

We know from Roelofs (1998:143) that in the eight-year-old N-children only 15% of all search attempts were complete GAO-units. N-children of this age and younger mostly leave one or two of these semantically/pragmatically obligatory information units implicit (Examples 12 to 14). From age eight on, children more frequently express complete GAO-units (Example 15).

**Example 12**

Search attempt -location +goal +outcome (PI-child; age 7;10)

Patrick:

en toen zaten ze overal naar hem te kijken.
(and then they (= boy and dog) were looking everywhere for him (= frog)

maar ze konden hem maar niet vinden
(but they (= boy and dog) couldn't find him (= frog))

In Example 12, the adverb of place 'everywhere' is judged as a 'light adverb' since it does not explicitly refer to one of the specific search attempt locations. The adverb 'everywhere' is therefore not coded as +location.

Example 12 also illustrates that the analysis of search attempts is partly dependent on the analysis of co-referential cohesion, since all the pronouns used, such as 'ze' (they) and 'him' (hij) in the first contribution and 'ze' (they) in the second contribution have to be judged as clear. When such pronouns do not clearly refer to either the frog, the boy or the 'boy + dog' together, it is not possible for the listener to detect who is searching for what. When, for instance, the pronominal reference to 'the frog' is unclear (which is not the case in Example 12) we then had to score -goal (see 14A and further).

**Example 13**

Search attempt +location +goal -outcome (PI-child; age 5;9)

Jesco:

en het jongetje die zat op een boom <om> om te kijken
(of der) of in een vogelnestje een kikker zat.
(and -the- boy- that- sat- in- a- tree- <to>- to- look
<- if- there-> if-in-a- birds nest- sat- a -frog) (direct translation)
the boy sat in a tree to look whether the frog was in a birdnest
Example 14  
*Search attempt +location +goal +outcome (PI-child; age 6.10)*

Adriaan:  
*hi<keek <in het> in de gat van de boom.*  
(he looked <in the> in the hole of the tree)

Adriaan:  
*<toen zat> er kwam een uil uit.*  
(then sat> there came an owl out of it)

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Example 15  
*GAO-unit. Search attempt +location +goal +outcome (PI-child; age 8.2)*

Tanja:  
*Jan roept: "kikker, kikker, waar ben je?"*  
(Jan calls: "frog, frog, where are you??")

Tanja:  
*Jan klimt in een boom om te kijken of die daar zit.*  
(Jan (= boy) climbs in a tree to look if he (=frog) is sitting there)

Tanja:  
*maar er komt een uil uit.*  
(but an owl comes out).

In Example 15, the PI-child needs more narrative contributions to express a GAO-unit. In Example 16 (fictive) we show how narrators can follow Grice’s principles (1975) of being informative and not redundant (Maxim of Quantity); for instance, a complete GAO-unit is packaged when narrated in a conjunction reduction construction forming one single morphologically/ syntactically and semantically/ pragmatically correct T-unit (see 8.4).

Example 16  
*GAO-unit: Search attempt +location +goal +outcome (fictive)*

Child:  
*The boy climbed in a tree to look for the frog in a big hole, but encountered an owl instead.*

Here we want to explore whether the number of PI-children and N-children that narrate GAO-units are comparable. And, is there comparable development with age? Following the assumption that children learn to express language from little to more complex, we want to explore how many PI-children compared to N-children express: (1) all the classical 7 search attempts +location, (2) all the 7 search attempts +location in addition with the obligatory semantic/pragmatic information +goal or +outcome, and (3) the 7 search attempts as complete, complex GAO-units that form a mini-narrative on their own (see Table 14.5). These three levels indicate the normal course of development.

When we look at developmental level (1), we see from Figure 14.4 that both N- and PI-children improve significantly with age in expressing the 7 search attempts +location (see Appendix 14; Table 14c). The location of a search attempt is always expressed by an adverb of place that clearly refers to one of the seven Frog story search locations mentioned above (see Table 14.3). When we compare the Dutch-speaking N-children (Roelofs, 1998) to the English-speaking N-children (Trabasso and Rodkin, 1994:100), the Dutch N-children seem to be relatively slower in their development. However, it may be the case that the explicit criteria for

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20 Mantel-Haenszel Chi square test for linear association; 1 df = 38.09, p < 0.0001.
The ability to tell a narrative

+location (excluding light adverbs) were not that strictly applied by Trabasso and colleagues (1992).

Figure 14.4  Percentage of N-children (n=15 per age group) and PI-children (n=20 per age group) that express search attempts +location (Loc)

As expected, although we see a relatively low performance of the five-year-old N-children, significantly\textsuperscript{21} fewer PI-children than N-children produce search attempts +location. We also detected how many N- and PI-children produced too little search attempts +location according to their age, largely based on the age-related cut-off points of $z \leq -2$. There are significantly\textsuperscript{22} more (41%; n=49) PI-children than N-children (27%; n=20) that produce not enough search attempts +location for their age. These PI-children do not even reach level (1) and therefore show a clear language delay in their development of narrative skills.

When we look at developmental level (2), we know from the literature that children learn to express the goal (purpose) before the outcome (Trabasso and Nickels, 1992). Therefore we first present the percentage of N- and PI-children that include search attempts +location +goal -result in Figure 14.5 and then the percentage of N- and PI-children that include search attempts +location -goal +result' in Figure 14.6 (see also Appendix 14; Table 14c).

From Figure 14.5 we see two different interfering zigzag patterns. No significant group effect was observed. When we compare the Dutch-speaking N-children (Roelofs, 1998) to the English-speaking N-children (Trabasso and Rodkin, 1994:100), the Dutch N-children show a comparable developmental course. At age seven the children seem to be behaving close to adult level. From research in English it is reported that 47% of all nine-year-old English-speaking N-children and

\textsuperscript{21} Chi square (1 df; after continuity correction; 2-sided) = 3.92, p<0.48.

\textsuperscript{22} Fisher's Exact, df=1 (2-sided)= 4.05, p<0.047.
55% of the adults (n=12) expressed the search attempts' goal, called 'purpose' by Trabasso and Rodkin (1994). This is the same level in Dutch: 47% of all Dutch-speaking seven-and eight-year-old N-children express the goal. The eight-year-old PI-children thus show a relatively high performance.

The ability to express the goal of a search attempt significantly\(^{23}\) improves with the N- and PI-children's age. However, instead of the goal of a search attempt (35%) the nine-year-old PI-children prefer to explicate the result of a search attempt (70%) (see Figure 14.6).

From Figure 14.6 we see that there are relatively more N-children and PI-children that express search attempts +location -goal +outcome' than N-children and PI-children that include +goal -outcome'. No significant group-effect was found (see also Appendix 14; Table 14c). When we look at development with age, we see that the ability to express search attempts +location -goal +outcome' linearly\(^{24}\) improves with age, and more quickly than the ability to express search attempts +goal.

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\(^{23}\) Mantel-Haenszel Chi square test for linear association; 1 df = 12.55, \(p < 0.0001\) (nine-year-old PI-children excluded).

\(^{24}\) Mantel-Haenszel Chi square test for linear association; 1 df = 9.37, \(p < 0.0001\).
The ability to tell a narrative

Most importantly, this result suggests that Dutch-speaking N- and PI-children are able to express search attempts +location -goal +outcome before they can express search attempts +location +goal -result. Outcomes are more informative than goals (purposes) since they allow one not only to infer whether or not an attempt succeeded, but also to infer its goal (purpose). Like adults (Trabasso and Nickels, 1992; Trabasso and Rodkin, 1994) we observed a few instances of this tendency in some eight-year-old N-children and nine-year-old PI-children. These narrators then are following Grice's principles (1975) of being informative and not redundant, such as in Example 11.

When we look at developmental level (3), we see from Figure 14.7 that the ability to produce GAO-units improves with the N- and PI-children's age, although we see that a relatively very small number of nine-year-old PI-children expresses GAO-units (see Appendix 14; Table 14c). When we look more closely, it becomes clear that none of the four-year-old N- and PI-children are able to produce GAO-units, and this is comparable to earlier results of same-aged English-speaking N-children (Trabasso and Nickels, 1992). From age six on, more of the N- than PI-children start to express GAO-units. The nine-year-old P-children perform differently from younger PI-children, since most of these oldest PI-children (70%), as we have seen (Figure 14.6) express only search attempt +location -goal +outcome.

Since we know that many PI-children, even in the oldest age groups, give too little morphological/syntactic (Chapter 5) and semantic/pragmatic information (see 12.5) in the conversational interview genre, the chances increase that some of these PI-children do not follow the principle of being informative and not redundant (Grice, 1975) (see 12.5 and 12.6), but leave out verbal elements and then are by chance not redundant.

25 Mantel-Haenszel Chi square test for linear association; 1 df = 21.96, p < 0.0001
In sum, the PI-children have difficulties in expressing the exact location of search attempts, although the location is always depicted on the pictures. Why is this the case? Probably, a subgroup of PI-children may have difficulties with the visual information processing of two-dimensional pictures in which they have to see three-dimensional locations. For example, some PI-children interpret the picture where the boy is climbing on a rock as him walking towards a hole in the snow (see Appendix 3a). Another reason may be that another subgroup of PI-children used 'light adverbs' such as there or here to mention the different locations. Then the exact location is not interpretable for a listener who cannot see the pictures, and therefore light adverbs are not counted as explicitly narrated search attempts +location. Yet another subgroup of PI-children may clearly have seen the depicted locations of the search attempts, but could not mention +location, probably due to morphological/syntactic limitations in forming complex T-units that are extended with optional satellites (Dik, 1989), such as with overt adverbs of place in the form of a PP, such as 'in de boom' (in the tree) (see 6.3 and 12.5).

Furthermore, only few N-children and even fewer PI-children produced the most complex search attempts +location +goal/result or complete GAO-units. Since their number was so low, no significant group effects were found. However, significantly more older N- and PI-children than younger N- and PI-children take into account the listener's perspective and mention the extra semantic/ pragmatic obligatory information necessary to come to a good understanding of the Frog story search attempts. Despite this improvement with age, we are of the opinion that the major development in this area is expected to take place beyond age eight/nine.
14.3.5 Internal responses
The narrative contributions in which the narrator expresses what the boy feels are classified as internal responses. There are two opportunities to do this that count as planning component: (1) the boy feels sad after the frog disappeared, and (2) the boy feels happy when he finds and gets his or another frog back (see Table 14.3). In the literature, these types of references to emotional states are also called frames of mind (Bamberg and Damrad-Frye, 1990).

As mentioned above (see 14.1), if a narrator expresses the internal feelings of the main character this is more complex then when a narrator only expresses the physical actions of the main character. The expression of internal responses are therefore considered as appropriate and sophisticated semantic/pragmatic behaviour, signalling that the child as a narrator moved to a higher level: from describing narrative events towards the internal motivations of the narrative's main character (e.g. Sanders, 1994).

This narrative ability is not only related to the ability of taking perspective as part of a Theory-of-Mind, but also to the ability of establishing coherence by the description of emotional evaluation, that develops in normally developing English-speaking children from age four (Hudson et al., 1992). Normally developing English-speaking pre-school girls proved to be better in expressing these frames of mind in personal narratives than boys (Fivush, Haden and Adam, 1995). Capps, Losh and Thurber (2000) found that PI-children on the autistic spectrum have difficulties in this area. Here we want to know whether the numbers of PI-children and N-children that narrate internal responses are comparable. And, is there comparable development with age?

In Figure 14.8, we present the percentage of N-children and PI-children that formulate at least one internal response. Since we know that the possible observations of this specific language behaviour are low in advance (Trabasso and Rodkin, 1994; Roelofs, 1998) we suggest that when children show this behaviour at least once per narration, this is not an indication that they cannot express frames of mind. From Figure 14.8 we see that there are relatively few four-, eight- and nine year-old PI-children that produce at least one internal response as compared to N-children.

We expected that PI-children express fewer internal responses compared to the N-children. PI may have a negative influence on the ability to identify oneself as a narrator with the internal feelings of the main character of the narrative. For instance, Capps, Losh and Thurber (2000) observed that PI-children on the autistic spectrum were less likely than language matched N-children to identify the causes of the main character's internal states. Rather, these PI-children tended simply to label emotions and explain actions, being more restricted in the range of different linguistic devices used.

This expectation, however, could not be supported by the results, since the differences between the two populations are too small to be significant. Only at eight years do the N- and PI-children start to diverge.
We see that the ability to express at least one internal response improves with age. However, a closer look at the data shows that only six children (1 eight-year-old N- and 1 PI-child and 4 nine-year-old PI-children) expressed both internal responses. These findings confirm earlier reported results, as all five-year-old and half of the nine-year-old English-speaking N-children never include the internal response that can be inferred from one of the last three pictures (boy happy with retrieved frog) (Bamberg and Damrad-Frye, 1990).

Comparable to the ability to express GAO-units, the major development of the ability to express internal responses may take place beyond age eight/nine years of age, as was suggested earlier (Peterson and McCabe, 1983; Bamberg and Damrad-Frye, 1990; Bamberg, 1993a).

14.3.6 Outcome

High attention and task orientation is required in order to complete the Frog story by expressing its outcome: goal 2 (component 17 in Table 14.3): boy finds the frog/ *boy finds a(nother) frog/ boy finds the frog and other frog(s) and goal 1 (component 18 in Table 14.3): boy retrieves the frog/ boy retrieves a(nother) frog/ *boy retrieves the frog and other frog(s). Here, we want to know whether there are as many PI-children as N-children that express the outcome (goal 2 and goal 1). And, is there development with age?

Both actions are a very important part of the story, depicting in terms of Labov and Waletsky (1967) the highpoint of the story. Bamberg and Marchman (1990) were among the first that did this analysis. In order to get insight in task orientation and the influence of attention on the narrative task, we present in Figure 14.9 the

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26 Mantel-Haenszel Chi square test for linear association; 1 df = 13.85, p < 0.0001
The ability to tell a narrative

percentage of N-children and PI-children that express no outcome. Significantly\(^{27}\) more PI-children than N-children express no outcome, decreasing with age\(^{28}\) in both populations.

Figure 14.9  Percentage of N-children (n=15) and PI-children (n=20 per age group) that express no outcome

<table>
<thead>
<tr>
<th>Age</th>
<th>N-chi: no outcome</th>
<th>P-chi: no outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 yrs</td>
<td>33</td>
<td>80</td>
</tr>
<tr>
<td>5 yrs</td>
<td>7</td>
<td>35</td>
</tr>
<tr>
<td>6 yrs</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>7 yrs</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>9 yrs</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

There are some N- and PI-children that express that the boy found the frog, other frog(s) or both, but do not express that the boy got the frog or another frog back in order to take home (as depicted on the last picture 24; see Appendix 3a). The story they narrate is thus still incomplete (Figure 14.10).

We clearly see a turning point at age six. Between age four and five more N- than PI-children start to express the success of all search attempts. After age six more PI-children than N-children express only goal 2. The PI-children show a semantic/pragmatic language delay for two reasons. First, the four- and five-year-old PI-children cannot express goal 2 like same-aged N-children do. Second, the six- to nine-year-old PI-children express only goal 2, like four-, five and six-year-old N-children do.

\(^{27}\) Chi square (df 1; after continuity correction) = 10.92, \(p<0.001\).

\(^{28}\) Mantel-Haenszel Chi square test for linear association (1 df)= 22.61, \(p < 0.001\).
Chapter 14 Semantic/Pragmatic narrative development

Figure 14.10 Percentage of N-children (n=15) and PI-children (n=20) per age group that express goal 2: the boy finds the frog/other frog(s)/ both (planning component 17 in Table 14.3)

In Figure 14.11 we present the percentage of N- and PI-children that express both goal 1 (retrieve/take home/get back lost object) and 2 (find lost object). When both goal 1 and 2 are expressed this forms a complete outcome. Goal 2 and goal 1 have different options that are appropriate/inappropriate following certain conditions (see Table 14.3). The way in which goal 1 successively is expressed is highly dependent on the way in which goal 2 is expressed. Here, high demands are made on children's ability to link the contributions that concern the expression of goal 2 and 1 coherently and cohesively, especially by means of clear co-referential cohesion (see 14.4 and further).

Since there are also N- and PI-children that express goal 1 (take home) and do not express goal 2, the percentage of narrators per age group that include goal 2 (Figure 14.10) and that include both 2 and 1 (Figure 14.11) do not always count up to 100%.

From Figure 14.11 we see that significantly more N-children than PI-children express the narrative's highpoint. And, significantly more older N- and PI-children express the complete outcome than younger N-children (Roelofs, 1998:142) and PI-children. These age effects in the Dutch-speaking N- and PI-children resemble earlier results with respect to English-speaking N-children (Peterson and McCabe, 1983; Trabasso and Rodkin, 1994).

Earlier findings (Trabasso and Rodkin, 1994) indicate that the ability to narrate goal 2 (find) and 1 (get/take home/retrieve) starts at age five in English-speaking N-children. They scored these components when narrators explicitly mentioned only 'the frog'. We used a broader definition (because the picture book is not clear on this

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29 Chi square (1 df; after continuity correction) = 3.94, p<0.047.

30 Mantel-Haenszel Chi square test for linear association; 1 df = 22.22, p < 0.0001.
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point) and found under our conditions that the development to narrate the story highpoint start at age four in Dutch-speaking N-children.

Figure 14.11 Percentage of N-children (n=15) and PI-children (n=20) per age group that express outcome 1 (goal 2) + 2 (goal 1): the boy has found and takes back home the frog or another little frog

<table>
<thead>
<tr>
<th>Age Group</th>
<th>N-chi: goal 2 (find) + goal 1 (take)</th>
<th>PI-chi: goal 2 (find) + goal 1 (take)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 yrs</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>5 yrs</td>
<td>40</td>
<td>25</td>
</tr>
<tr>
<td>6 yrs</td>
<td>73</td>
<td>50</td>
</tr>
<tr>
<td>7 yrs</td>
<td>80</td>
<td>45</td>
</tr>
<tr>
<td>8 yrs</td>
<td>67</td>
<td>60</td>
</tr>
<tr>
<td>9 yrs</td>
<td>67</td>
<td>60</td>
</tr>
</tbody>
</table>

14.3.7 Results: Planning Components

Now that we have counted the inclusion of all particular planning components in narrating the Frog story, we can present the mean total number of planning components expressed (Figure 14.12), as this is only a small selection from all narrative contributions31 (i.e. normal range 40 to 55 narrative contributions per Frog story in Dutch; see 14.1).

Figure 14.12 The mean number of planning components (plan. comp.) (max. 19) per age group expressed by 75 N-children (Roelofs, 1998) and 120 PI-children

<table>
<thead>
<tr>
<th>Age Group</th>
<th>N-chi: planning components</th>
<th>PI-chi: planning components</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 yrs</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>5 yrs</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>6 yrs</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>7 yrs</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>8 yrs</td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td>9 yrs</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

31 The numbers are higher than in Table 6.1 Roelofs, 1998:140, because we included the search attempts whereby the location of the search attempt is not mentioned by the children which Roelofs excluded.
The PI-children express significantly\(^ {32} \) fewer planning components that the N-children, except for the five-year-old PI-children. With age both N-and PI-children express significantly\(^ {33} \) more planning components. The seven- to nine-year-old PI-children produce the same amount of planning components as the one year younger N-children.

To calculate the percentage of narrators of each age group who included a particular planning component (Figures 14.2 to 14.11) and the mean number of planning components is not sufficient to find differences between the two groups, since extremely low and high percentages and numbers might cancel each other out. A finer differentiation is needed to detect possible differences between the PI- and N-children. In Table 14.6 we therefore present the amount of N- and PI-children that produce too few planning components for their age, based on computed age-related cut-off points per age group, largely based on \( z \leq -2 \). The analysis is based on the following cut-off points per age group: when four-year-olds produce less than 0, five-year-olds produce less than 4, six-year-olds produce less than 7 search attempts, and so on, children express too few relevant narrative plot information for their age (see also Table 14.3).

We see that relatively many N-children (15%) fall within this marked category. This suggests that the individual variation in narrating the Frog story is great, even in N-children. This confirms earlier results found in the cross-linguistic developmental literature. Much divergence in the study of Berman and Slobin (1994) was reported to be related to differences in narrative style.

### Table 14.6  
Number of N-children and PI-children that are deviant on computed cut-off points per age group (largely based on \( z \leq -2 \)) with respect to the number of planning components

<table>
<thead>
<tr>
<th>Planning components</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( n=75 )</td>
<td>( n=120 )</td>
</tr>
<tr>
<td>4 yrs ( \leq 0 )</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5 yrs ( \leq 4 )</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>6 yrs ( \leq 7 )</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>7 yrs ( \leq 8 )</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>8 yrs ( \leq 11 )</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>9 yrs ( \leq 11 )</td>
<td>-</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>11 (15%)</td>
<td>52 (43%)</td>
</tr>
</tbody>
</table>

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32 ANCOVA with the number of narrative contributions as covariate; group effect \( F(1,165)=5.57, \ p<0.019 \) (nine-year-old PI-children excluded).
33 ANCOVA with the number of narrative contributions as covariate; age effect \( F(4,165)=28.4, \ p<0.001 \) (nine-year-old PI-children excluded).
We see that significantly more PI-children (43%; n=52) than N-children (15%; n=11) fall within this marked category and express too few planning components for their age.

14.3.8 Conclusion: the ability to narrate the plot

We have shown that the PI-children as a group embed the beginning of the narrative significantly less often in time and express significantly fewer planning components than the N-children. Significantly more PI-children (43%) than N-children (15%) express too few planning components for their age. With respect to particular planning components, significantly fewer PI-children than N-children express all initiating events and search attempts plus their exact location. Also significantly fewer PI-children than N-children express the complete highpoint (outcome) of the story, i.e. that the frog or another little frog is taken home by the boy.

With age both N- and PI-children express significantly more planning components, although this development takes place at a higher rate in the N-children than in the PI-children. The PI-children have greater difficulty in narrating causally related actions the main character undertakes according to an underlying internally made plan. They have semantic/pragmatic narrative problems in expressing causality based on difficulties with linking narrative contributions coherently in a logical, causal way and in an explicit way. Like in conversation, frequently too little narrative information is expressed. The PI-children then violate Grice's (1975) Maxim of Quantity of being informative.

The first of these two language skills (link the narrative causally coherently) requires identification with the internal world of the main character, including some social-cognitive understanding of causal relations that explain human behaviour, especially between previous experiences that cause basic emotions that lead to certain actions. The second of these skills (be explicit) requires simultaneous identification with the listener (who cannot clearly see the pictures) in order to take into account the listener's needs. Both perspective taking based on the identification with the main character and on a causal understanding of human behaviour on the one hand and taking into account the listener's point-of-view on the other, are part of a Theory-of-Mind (ToM) (see 2.3.3).

As we know from the developmental literature (see 2.3.3) language output can give insight into difficulties with the social-cognitive development of a Theory-of-Mind (e.g. De Villiers and De Villiers, 2001, 2002). Although falling out of the scope of this thesis, the narrative language output of the PI-children suggests that they have difficulties in perspective taking and narrative taking and taking into account the other's point-of-view. In PI-children, problems in this area are frequently reported (e.g. Cohen et al., 1998; Beitchman et al., 2001).

We frequently concluded that even in the highest age groups in both N- and PI-children certain narrative abilities are still in development, for instance, giving expression to the fact that the boy possesses the frog at the begin of the story or expressing GAO-units in the middle of the story and the complete outcome at the

34 Fisher's exact (2-sided) (1 df) = 17.34, p<0.0001.
end. We suppose that a major improvement of narrative skills will take place beyond eight/nine years of age. This would fit in with a cognitive explanation since according to Piaget from age nine on N-children become able to give a synopsis of events. Then they can reclassify and reorganize events into an abstract representation of one hierarchical theme (Piaget, 1959; Applebee, 1978).

14.4 Co-referential Cohesion in narrative: an introduction

The correct use of various referential devices is not only a crucial condition for constructing a cohesive narrative, but also for constructing plot-related narrative contributions coherently. For instance, as we have shown in 14.3.6, clear reference is necessary to relate the same theta roles (Dik, 1989) agent and patient to the same entity over successive narrative contributions.

The analysis of co-referential cohesion, frequently referred to as reference and anaphora use, as been studied by different researchers on the basis of the Frog story in N-children, such as English-speaking N-children (Karmiloff-Smith, 1981; Bamberg, 1987; Wigglesworth, 1990), Spanish-speaking N-children (Gutierrez-Clellen and Heinrichs-Ramos, 1993), Turkish-speaking (Aarssen, 1996) and Dutch-speaking N-children (Zijlemaker, 1993; Aarssen, 1996).

But there are also some studies on LI-children and PI-children, such as in LI-children (Liles, 1985), Dutch-speaking LI-children (Verkoeijen, 1999), and Dutch-speaking PI-children (Dijkhuis, 1994) and PI-children with ADHD (Velgersdijk, 2001).

When children have to tell a narrative elicited with a picture book to a investigator, who claims in advance not to know the story (see 3.3), they are prompted by the pictures to tell what they see but then easily forget to take into account the point of view of the listener (see 14.3.8). She can only partly see the pictures (from a certain distance and upside down). This results in more use of deictic referents that are not connected to previously mentioned entities but are referring to the entities on the pictures in the here-and-now (e.g. Aarssen, 1996:24-25; Roelofs, 1998:145).

To mention entities and maintaining reference to them over several narrative contributions is still in development in school-aged children (e.g. Bamberg, 1986; Aarssen, 1996; Hickmann, 1995, 2003). Roelofs (1998:120) showed that the Dutch-speaking 75 N-children in the older age groups make fewer unclear introductions than in the younger age groups, but still have difficulties in maintaining clear reference by means of pronouns in the narrative genre.

As in conversation, with respect to relevancy (see 12.1 and 12.2), a narrative contribution is said to be optimally relevant when it is easy for the interviewer to realize the referential connections between old and new information with a minimum of processing effort. This effort can be minimized by the child by establishing clear and simple co-referential relations. Thus, the amount of correctly used referent introductions and subsequent mentions is globally indicative of the ability to transmit relevant information. Here, we want to know whether the PI-children produce a comparable amount of clear references as the N-children. And, is there a comparable development with age?
From our analysis of co-referential cohesion in the conversational interview genre (see 13.4 to 13.8) and from a pre-analysis of co-referential cohesion in the narrative genre (Dijkhuis, 1994; Velgersdijk, 2001), we know that PI-children are likely to have difficulties in establishing clear co-referential cohesion in the narrative.

First, we found that the PI-children produce an amount of referents comparable to the N-children. No group-effect was observed. The amount increases significantly linearly in the PI-children similarly to the N-children. Next, we used the same analysis procedures as in the conversation (see 13.4 to 13.7). We counted all first mentions and subsequent mentions of +animate referents, further divided into referent maintenances and referent shifts. Each referent expressed is judged for the child's ability to take into account the interviewer's point of view, it being either clear or unclear (de Villiers, 2001a, 2001b). We also took into account the amount of unclear referents caused by morphological/syntactic and semantic inappropriateness. In the next sections, we will present the results with respect to referent introductions (14.5), referent maintenance (14.6) and referent shifts (14.7), ending with some concluding remarks about the ability to establish co-referential cohesion in a narrative (14.8).

14.5 Referent Introduction in narrative

14.5.1 Research questions, definitions, and operationalisations

In Dutch, when an entity is introduced for the first time and the child correctly assumes on the basis of the information about the task given in advance, that the entities are not known by the interviewer, the child has to use an indefinite NP (Aarssen, 1996; see 13.5) (Example 17).

Example 17  
Appropriate first mention by means of an indefinite NP (PI-child; age 9;6)

Wendy:  
een jongen, een hondje, die hadden een kikker gevangen.  
(a boy, a dog they caught a frog)

However, since the investigator tells the child in advance "this is a story about a boy, a dog and a frog" as part of the instruction (see 3.3), the child can presuppose that these entities are known information to the listener and can therefore correctly use a definite NP. Thus, we coded the first mention of the boy, the dog and the frog at the beginning of the story by means of a definite NP as not pragmatically marked. In general, when an entity is known by both listener and narrator or is related to an already mentioned topic a definite NP can be used (Hickmann, 2003).

35 ANCOVA with the number of narrative contributions as covariate; age effect F(4,165)=7.36, p<0.001. No age*group interaction effect was found (nine-year-old PI-children excluded).
36 ANCOVA (Polynomial contrast) with the same covariate; N-children: F(4,69)=12.42, p<0.0001; Linearity: p<0.0001; PI-children: F(5,113)=8.95, p<0.0001; Linearity: p<0.0001 (nine-year-olds included).
37 Unclear reference is also called implicit reference in Dutch research, following STAP (Van den Dungen and Verbeek, 1999).
In Table 14.7 we give an overview of the forms coded as clear and the semantic-pragmatically marked unclear (*) first mentions, whereby a certain living entity is for the first time introduced during the narrative.

In Dutch, the preferred form for introducing a brandnew entity is an indefinite NP in focus-position (Aarssen, 1996:93). Here, we will discuss some marked forms, typical for the narrative genre (Example 18 to 20).

Example 18  
First mention by means of a pronoun (PI-child; age 9.6)

Jurrien:

er was eens een jongetje x Pim x.
(once upon a time there was a boy x Pim x)

en die x ging op een dag vissen met zijn hond y Bas y.
(and he x went one day fishing with his dog y Bas y)

en toen hadden ze xy een kikker gevangen.
(and they xy caught a frog)

In Example 18, the introduction of a group of referents by means of a pronoun can be scored as clear when the single individual entities are specified already. In the Frog story the main characters (the boy and the dog) are frequently mentioned together for the first time with the pronoun they.

Example 19  
First mention by means of a definite NP (PI-child; age 6.3)

Robert:  
*de bijen komen.  
(*the bees come)

In Example 19, the beehive is not mentioned in advance. The semantic field to which bees belong is not active in advance. Therefore, the topic introduction by means of a definite NP is coded as *unclear.

Example 19 is also illustrative for the fact that each genre may trigger its genre-specific semantic/pragmatic referential problems: unclear referent introductions by means of definite NPs frequently occur in narratives (e.g. Aarssen, 1996; Roelofs, 1998). Use of a proper name for an introduction hardly ever occurs in the narrative genre, unlike the conversational interview genre (see 13.2.2).
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Example 20 Unclear first mention by means of a indefinite NP (PI-child: age 5;1)

Louis: kijk, *allemaal krokodiltjes komen te voorschijn
(look, a lot of little crocodiles appeared)

Paraphrasis: look, a lot of little frogs appeared

In Example 20, the referent is not clear, because of semantic mismatch. These instances are also scored as unclear referent introduction. Here, we want to know whether the amount of clear referent introductions expressed by the PI-children is comparable to the amount expressed by the N-children. And, is there a comparable development with age? Since autistic PI-children show difficulties in clear referent introductions (Tager-Flusberg, 1995), we expect some relatively milder difficulties in this area in the 120 PI-children (autistic PI-children were excluded).

14.5.2 Results: Referent Introduction in narrative

First, the PI-children produced a comparable amount of referent introductions (total mean: 9 to 11) as the N-children (total mean: 9 to 10) out of a total of 9/10 on the pictures. This means that the PI-children and N-children regularly introduce living entities to talk about in the story that are not depicted. No significant age-effect was found. Since the amount of possible referent introductions is fixed in the narrative genre, and is dependent on the number of characters depicted, the opportunity for introducing entities in the narrative is lower than in conversation (PI-children: 10 to 15; N-children: 13 to 17). This explains that also no age-effect was found. These results are comparable to those found in other Dutch-speaking N-children who narrate the Frog story (4;0 tot 10;0 years) (Aarssen, 1996:103).

When we look at the clear referent introductions, the following developmental patterns can be seen: the P- and N-children correctly express first mentions by means of an indefinite NP (in roughly 45% of all cases). No significant group-effect is observed. Although the eight- and nine-year-old PI-children express fewer indefinite NPs compared to the eight-year-old N-children, with age the production of indefinite NPs (the target form) increases linearly in both populations. Only some of the nine-year-old PI-children as opposed to most eight-year-old N-children introduce the boy, the dog and the frog as depicted on the first picture by means of an indefinite NP. On the basis of a more developed Theory-of-Mind these oldest PI-children can move away from their own perspective and take into account the perspectives of a listener, who claimed in advance to be unfamiliar with the story. Unexpectedly, these few PI-children are doing relatively well.

38 ANCOVA with the mean total number of all references as covariate. Age effect F(1,164)=2.62, p=0.037; No age*group interaction effect was found (nine-year-old PI-children excluded).
39 We counted the boy (1), the dog (2), the frog (3), the (swarm of) bees (4), the mole (5), the owl (6), the deer (?y) and the mother frog (8) and the little baby frogs (9) and optionally one little baby frog (10) that is taken back home.
40 One-way ANCOVA (Polynomial contrast) with the same covariate: not significant.
41 ANCOVA with the number of referent introductions as covariate; age effect F(4,164)=4.92, p<0.001; No age*group interaction effect was found (nine-year-old PI-children excluded).
42 ANCOVA (Polynomial contrast); N-children: F(4,69)=3.44, p=0.013, Linearity: p=0.001; PI-children: F(5,119)=2.80, p=0.020, Linearity: p=0.0001.
Next, we explored how many first mentions are pragmatically marked; that is when the interpretation was judged as unclear (Figure 14.13). The PI-children produce significantly more unclear reference introductions than the N-children. We clearly see that the PI-children – except for the five-year-old PI-children – show a semantic/pragmatic language delay with respect to the ability to produce clear referent introductions. Just as in the conversational interview genre (see 13.5), a linear decrease with age of unclear referent introductions is found in the N-children (see Roelofs, 1998:149-150) and in the PI-children.

Figure 14.13 The percentage unclear reference introductions (calculated over the mean total number of reference introductions) per age group expressed by 75 N-children and 120 PI-children in narrative

In the narrative analysis we explored the different types of clear and unclear referent introductions in more detail. First, the PI-children produce significantly more zero-pronouns than the N-children (e.g. ‘Ø looks at the frog’), except for the five-year-old PI-children. Mostly, zero-pronouns are expressed in single clauses. In the older age groups the PI-children frequently use a direct voice construction without explicating who the speaker is (Example 21).

43 ANCOVA with the mean total number of all referent introductions as covariate. Group effect: F(1,164)= 17.45, p<0.0001; age effect F(4,164)=9.53, p<0.001; No age*group interaction effect was found (nine-year-old PI-children excluded).

44 One-way ANCOVA (Polynomial contrast) with the same covariate: N-children F(4,69)= 7.09, p<0.0001, Linearity: p<0.0001; PI-children (nine-year-old PI-children included ) F(5,113)=8.20, p<0.0001, p<0.0001.

45 ANCOVA with the number of unclear referent introductions as covariate; Group effect: F(1,164)=5.28, p=0.023; No age- or age*group interaction effect was found (nine-year-old PI-children excluded).
In the conversation we found a comparable problem. In the PI-children a substantial percentage of the unclear referent introductions was caused by subject or object drop, sometimes accompanied by main-verb-drop (see 13.5 and 9.2). Secondly, the PI-children as a group produce significantly more bare nouns than the N-children, especially the four-year-old PI-children (17% of all introductions) (see also 7.4). With age we observed a linear decrease in the production of bare nouns in the PI-children. Most referent introductions by means of a bare noun were scored as clear, although essential pragmatic information is missing, as bare nouns cannot be counted as either indefinite or definite NP’s. Their form gives no semantic/pragmatic information about the fact whether the entity referred to is given or new information (see Hickmann, 2003).

Thirdly, just as in the conversational interview genre, the N-children produce significantly more unclear referent introductions by means of definite NP’s (proper nouns; definite determiner/demonstrative pronoun + NP; possessive pronoun + NP) than the PI-children. In the N-children the production of definite NP’s decreases significantly with age. This result is comparable to the results suggested by Bamberg (1986) for German-speaking N-children (3;6 to 10;0 years) and Aarssen (1996:103) for Dutch-speaking N-children’s (4;0 to 10;0 years). This developmental trend was not found in the PI-children.

Lastly, in the conversational interview genre we found that a substantial part of all unclear referent introductions were caused by semantic mismatch. A few PI-children may have difficulties with the visual interpretation (e.g. depth) of the pictures (e.g. they interpreted the drawing of a deer as being of a cow) but mostly they did not know how to name the animal. In the narrative genre the PI-children make significantly more semantic mismatches (total mean: 24% of all unclear introductions) than the N-children (total mean: 18%), decreasing linearly with age in the PI-children.

46 ANCOVA with the number of referent introductions as covariate; group effect (1,164)=9.33, p<0.003; age effect F(4,164)=5.15, p<0.001; age*group interaction effect F(4,164)=3.15, p<0.016 (nine-year-old PI-children excluded).

47 ANCOVA (Polynomial contrast) with the same covariate; PI-children: F(5,119)=6.44, p<0.0001; Linearity p<0.0001 (nine-year-old PI-children included).

48 ANCOVA with the number of referent introductions as covariate; group effect: F(1,164)=14.98, p<0.0001; age effect F(4,164)=4.48, p<0.002; No age*group interaction effect was found (nine-year-old PI-children excluded).

49 ANCOVA (Polynomial contrast) with the same covariate; N-children: F(4,69)=3.73, p<0.008; Linearity p=0.009.

50 ANCOVA with the number of bare nouns + definite NP + indefinite NP introductions as covariate; group effect F(1,164)=7.55, p<0.007; age effect F(4,164)=4.54, p<0.002; age*group interaction effect F(4,164)=3.94, p=0.004 (nine-year-old PI-children excluded).

51 ANCOVA (Polynomial contrast) with the same covariate; PI-children F(5,119)=4.85, p<0.0001; Linearity: p<0.0001 (nine-year-old PI-children included).
We looked for individual differences within age groups and populations by computing age-related cut-off points (largely based on the z-scores) (see Table 14.8). Significantly more PI-children (12%; n=14) than N-children (3%; n=2) can be diagnosed as having severe semantic problems with respect to referent introductions, mainly caused by semantic mismatch.

Table 14.8  Mild and severe semantic problems with respect to first mentions per age group in 75 N-children and 120 PI-children in narrative

| Semantic mismatch | N-children | | | PI-children | | |
|------------------|------------|------------|------------|------------|------------|
|                  | first mentions | |          |            | | |
|                  | mild | severe | mild | severe | mild | severe | |
|                  | cut-off | n=75 | cut-off | n=75 | cut-off | n=120 | cut-off | n=120 |
| 4 yrs            | >37%   | 1     | >52%   | 0     | >37%   | 2     | >52%   | 3     |
| 5 yrs            | >37%   | 1     | >52%   | 1     | >37%   | 4     | >52%   | 0     |
| 6 yrs            | >30%   | 2     | >38%   | 0     | >30%   | 3     | >38%   | 4     |
| 7 yrs            | >30%   | 1     | >38%   | 1     | >30%   | 2     | >38%   | 0     |
| 8 yrs            | >23%   | 0     | >33%   | 0     | >23%   | 5     | >33%   | 6     |
| 9 yrs            | -      | -     | -      | -     | >23%   | 2     | >33%   | 1     |
| Total            | 5      | 2     | 18     | 14    |
| %                | 7%     | 3%    | 15%    | 12%   |

14.5.3 Conclusion: Referent Introduction in narrative
In the narrative genre both populations produce the same amount of first mentions, because the amount of characters is fixed as opposed to the conversational interview genre. In conversation, only the older PI-children produced more unclear first mentions than the N-children, but in the narrative the PI-children as a whole produce significant more unclear first mentions than the N-children. Similarly to the conversational interview genre, we found that in the PI-children significantly more unclarity is caused by morphological/syntactic disabilities, such as using zero-pronouns in case of morphological/syntactic obligatory arguments and the use of more semantically unclear first mentions. In the narrative genre the PI-children show clear difficulties in the ability to establish clear referent introductions, similarly to English-speaking autistic PI-children (Tager-Flusberg, 1995).

14.6 Referent Maintenance in narrative

14.6.1 Research questions, definitions and operationalisations
We counted all the referent maintenances in the narrative genre, using the same analysis procedure as in conversation (see 13.6). Here, we want to know whether the amount of clear referent maintenances expressed by the PI-children is comparable to the amount produced by the N-children. And, do they show a same developmental pattern with age? In Dutch, a pronoun is the unmarked coding for reference maintenance (Aarssen, 1996). We expect that this preference will become more

52 Pearson's Chi-square (after continuity correction) = 3.84, df = 1, p< 0.050.
salient across age groups, although we may detect a lower developmental rate in the PI-children.

14.6.2 Results: Referent Maintenance in narrative
Firstly, we observed that the number of referent maintenances is comparable in the PI-children (total mean: 18) and N-children (total mean: 19) and across the different age groups within populations, as no main-effects were found. This finding is comparable to the conversational interview genre, in which the number of referent maintenances in the N-children (total mean: 20) and PI-children (total mean: 20) was only slightly higher.

In Figure 14.14 we present the percentage of referent maintenance by means of an NP; this form is always coded as *too clear when a pronoun would have been better, following the nominal strategy (e.g. Bamberg, 1987) and redundancy is not reduced. We see that the percentage of referent maintenance by means of an NP proved to be higher in the narrative genre (PI-children: 6% to 12%; N-children: 10% to 17%) than in the conversational interview genre (PI-children 2% to 8%; N-children: 3% to 14% (see 13.6). As in the conversational genre, the percentage of referent maintenances by means of a *too clear NP proved to be significantly lower in the PI-children than in the N-children.

In most cases a pronoun would have better; the NP is *too clear but for the listener in all these instances it was absolutely clear about which entity the child is talking. The N-children therefore clearly avoid being unclear.

With respect to the percentage of NP maintenances we see a peak at age six in the N-children and a peak at age seven in the PI-children. At age six the N-children show the tendency to be more clear than necessary, being aware of the fact that they must be as clear as possible. The same tendency is found in the PI-children one year later (Roelofs, 1998).

From Figure 14.14 we can derive that in the narrative genre a pronoun is the preferred form for maintaining reference, developing from age six in the N-children and age seven in the PI-children. A comparable, but delayed developmental trend was found in the PI-children.

This result is not comparable to the results presented by Bamberg (1986) for German-speaking N-children (3;6 to 10;0 years), and Aarssen (1996) for Dutch-speaking N-children (4;0 to 10;0 years). They both only counted a limited type of referent maintenances (to the boy, dog and frog), and found relatively more maintenances by means of an NP than by means of a pronoun in N-children older than six. For the re-introduction of these referents, an NP is the preferred form. Unlike Bamberg (1986) and Aarssen (1996), we counted all +animate referents; as a consequence, more referent maintenances to other living entities in subsequent contributions are counted; then reintroduction is judged differently.

\textsuperscript{53} ANCOVA with the number of referent maintenances as covariate; group effect: F(1,164)=4.92, p<0.028; no age- or age*group interaction effect was observed (nine-year-old PI-children excluded).
The percentage of referent maintenance by means of an NP (calculated over all referent maintenances) per age group expressed by 75 N-children (Raelofs, 1998) and 120 P-children in narrative.

We also explored whether there are qualitative differences in the ability to successfully maintain reference between two clauses by means of a pronoun: in how many cases the thematic subject strategy was used as opposed the minimal distance strategy, leading to clear co-referential cohesion (see also Aarssen, 1996:37; see for explanation 13.6). The thematic subject strategy seems to be more complex than the minimal distance strategy, because more language material has to be stored and expressed between referent and antecedent. From Table 14.9 we see that in both populations the thematic subject strategy is followed more frequently than the minimal distance strategy in the narrative genre, comparably to the results with respect to the conversational interview genre (see 13.6).

The PI-children successfully use the thematic subject and minimal distance strategy, when the pronoun clearly refers to its antecedent in the previous clause. However, they do this significantly fewer times than the N-children. The older P- and N-children make relatively more successful use of the thematic subject strategy than younger N- and PI-children. The minimal distance strategy increases from four to eight years in the N-children and from four to seven years in the PI-children and than decreases again.

The same pattern was found in conversation for both N- and PI-children. A possible explanation is that from seven years of age, the children talk more about scenes in which two or more different entities are involved within two successive narrative contributions. As a consequence, the referent maintenances to one entity over two contributions decreases at age seven, whereas the referent shifts increase at that age.

54 ANCOVA with the number of referent maintenances as covariate; group effect F(1,164)= 4.19, p<0.042; age effect F(4,164)=5.16, p<0.001; no age*group interaction effect was observed (nine-year-old PI-children excluded).

55 ANCOVA with the number of referent maintenances as covariate; group effect F(1,164)= 11.13, p<0.001; age effect F(4,164)=5.16, p<0.004; age*group interaction effect F(4,164)=4.46, p<0.002 (nine-year-old PI-children excluded).
In the scenes depicted in the Frog story the entities involved are mainly animate. Unlike the narrative, the conversation gives the children relatively more freedom in their choice of the number of entities to talk about; they are also confronted with turn alternations in the conversation that mostly also involve a shift of referents. The chains of referent maintenances in the narrative can therefore be longer than in conversation. Fewer instances of clear pronominal referent maintenances, no matter what strategy was used, are observed in narrative than in conversation (see 13.6).

These results suggest that it might be more difficult in the narrative than in the conversational interview genre to express clear pronominal referent maintenances following one of the two strategies. As mentioned earlier, another explanation for the difference in genre performance is that children are sometimes encouraged by the pictures to use pronominal deictic reference (sometimes accompanied by pointing with fingers or eyes to the pictures) instead of cohesive pronominal anaphoric reference.

Furthermore, when children maintained reference with successive pronouns referring to an antecedent that is not clear, we scored this as unclear 56 (Example 22).

Example 22 Unclear pronominal maintenances by means of pronouns in a chain (PI-child; age 5;9; Picture of the boy on the rock)

| Robin: nou, <hij> hij stond (hij derop> op de stenen. (now, <he> he stood <he on it> on the rocks) |
| Robin: nou hij staat <op> op de grote steen. (now, he stands <on> on the big rock) |
| Robin: hij staat door de struiken. (he stands through the bushes) |

In Example 22, the first 'hij' (he) is not a clear reference at that point in the narrative (the preceding context required a noun) Then, all subsequent mentions using 'hij' are also coded as unclear: although the cohesive link is clear enough, the entity remains unclear.

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56 The narrative data of the N-children were recoded with respect to chains of unclear pronominal reference with permission of Roelofs.
unclear. Self-correction would be possible in order to fulfill the needs of the listener. In older N-children we found occasional repairs of unclear pronouns (e.g. Purcell and Liles, 1992) (Example 23).

Example 23  
Self-correction of unclear pronoun (N-child; age 8;9; picture of the boy on the rock)  
Koen:  
«en hijx ging op de rots > dat jongetje ging op de stenen staan.  
(<and he, was climbing on to the rock > that boy, climbed up on to the stones)  

In Figure 14.15 we present the percentages of unclear pronominal referent maintenance (within a clause, between two adjoining clauses and with more clauses in between).

Figure 14.15  
The percentage of unclear pronominal referent maintenance (calculated over the total number of referent maintenance) per age group expressed by 75 N-children and 120 PI-children in narrative  

The percentage of unclear pronominal reference is indeed much higher in the narrative than in the conversational interview genre in both N- and PI-children. Whereas the N-children did much better than the PI-children in the interview (see 13.6.2), this difference is not observed in the narrative genre. The percentage of unclear pronominal reference in the PI-children as a group is not higher than in the N-children, except in the five- and six-year-old PI-children. We observed a
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significant age-effect: in both groups the percentage of unclear pronominal referent maintenances decreases\(^{57}\) with age.

Again, a substantial percentage of the unclear referent maintenances is caused by morphological/ syntactic and semantic inappropriateness. As with referent introductions, referent maintenances can be judged as unclear, because of semantic mismatches (Example 24).

**Example 24**  
Unclear referent maintenance because of semantic mismatch (PI-child; age 4;3; Picture of the deer)

Gert-Jan: een hond, een hele grote hond,  
(a dog, a very large dog)

Semantic paraphrasis: there is a deer, a very large deer

Gert-Jan: het is een nijlpaard, !  
(it is a hippopotamus,)

Semantic paraphrasis: it really is a deer!

As a group the PI-children make significantly\(^{58}\) more semantic mismatches than the N-children. With age we observed a linear decrease\(^{59}\) in both N-children and PI-children.

We also observed that unclear referent maintenance by means of zero-pronouns were frequent in direct voice constructions (Example 25).

**Example 25**  
Referent maintenance by means of zero-pronouns in direct voice constructions (PI-child; age 8;2)

Tanja: de jongen kijkt uit het raam.  
(the boy looks out of the window)

Tanja: \("\) maar oh, wat is dat?\("\)  
("but oh, what is that?")

Paraphrasis: the boy says: " but oh, what is that?"

Tanja: \("\) dat is mijn hond.\("\)  
("that is my dog")

In Example 25 it is not clear whether the narrator or the main character expresses what is said. Not all zero-pronouns in direct voice constructions are unclear. Once the speaker in a direct voice construction is expressed, the other succeeding utterances in the direct voice have an identical underlying main-clause structure as the previous construction. The main-clause can be left implicit to avoid being

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57 ANCOVA with the number of all referent maintenances as covariate; No group effect was observed; age effect F(4,164)=7.82, p<0.0001 (nine-year-old PI-children excluded).

58 ANCOVA with the number of bare nouns + definite NP + indefinite NP maintenances as covariate; group effect: F(1,164)=10.43, p<0.0001; age effect: F(4,164)=10.43, p<0.0001; no Age*group interaction effect was found (nine-year-old PI-children excluded).

59 ANCOVA (Polynomial contrast) with the same covariate; N-children: F(4,69)=5.33, p<0.001, Linearity p<0.0001; PI-children: F(5,113)=7.18, p<0.0001, Linearity: p<0.0001 (nine-year-old PI-children included).
redundant only if the narrator has made clear in the previous contribution who is talking (Example 23; second arrow).

With respect to the direct voice constructions, we observed large individual differences; significantly more P-children (n=30) than N-children (n=6) frequently use direct voice constructions. It could be a matter of style (Berman and Slobin, 1994), but it seems to be an indication of semantic/pragmatic disability: in direct voice constructions the perspective is with the main character and not, as in indirect voice constructions, with both the narrator and main character (Sanders, 1994). Some PI-children told a large part of the Frog story only in direct voice constructions, especially at most exciting or difficult parts. This results in utterances such as "Frog, frog, where are you?", "au", "sstt", "let's go", "dog, come on, we are going", and so on as if the children only had to fill in the comic strip speaking balloons. With respect to the percentage of unclear referent maintenances by means of direct voice zero-pronouns (N-children: 7%; PI-children: 20%), we observed no significant main-effects, because of the large individual differences.

In the amount of unclear referent maintenances by means of zero-pronouns (including the direct-voice-zero-pronouns) (N-children: total mean 28%; PI-children: 51%) we can observe a significant group-effect. With age unclear zero-pronoun maintenances linearly decrease in both populations, although at a higher rate in the N-children.

14.6.3 Conclusion: Referent Maintenance in narrative
In the narrative genre the PI-children produce the same amount of referent maintenances compared to the N-children. The N-children produce significantly more NP referent maintenances that are judged as too clear than the PI-children. The N-children frequently prefer to use an NP where a pronoun would be better to avoid redundancy.

When we look at complexity, two significant group-effects were found. Although the PI-children followed the thematic subject-strategy more than the minimal distance strategy like the N-children, both strategies for clear referent maintenance were used significantly less frequently by the PI-children than by the N-children. This is different from the conversation.

Secondly, the PI-children produce significantly more unclear pronominal referent maintenances of which a substantial percentage was caused by morphological/ syntactic and/or semantic inappropriateness. In sum, the results confirm that the PI-children have difficulties in establishing clear referent maintenance in the narrative genre.

60 Pearson's Chi-square (after continuity correction)= 7.77, df = 1, p< 0.005.
61 ANCOVA with the number of all zero-pronouns used to establish referent maintenances as covariate; Group effect F(1,164)=8.70, p<0.043 (nine-year-old PI-children excluded).
62 ANCOVA (Polynomial contrast) with the same covariate; N-children: F(4,69)=4.75, p<0.002; Linearity: p<0.0001; PI-children: F(5,113)=4.33, p<0.0001; linearity p<0.0001 (nine-year-old PI-children included).
14.7 Referent Shift in narrative

14.7.1 Research questions, definitions and operationalisations
As discussed in 13.7, a referent shift is coded in case a subsequent mention refers to another entity than the previous one. All referent shifts by means of (in)definite NP's and (zero)pronouns were coded as either clear or unclear (Examples 26 and 27).

Example 26 Clear referent shifts by means of definite NP's (PI-child; age 7:8)

Tim: →

(en het jongje, viel van een uil.
(and the boy fell from an owl))

Tim: ←

<en hij> en het hondje, kreeg de bijen, achter zich aan.
(<en he> and the dog, got the bees, chasing him)

Tim: →

en de uil, vloog achter het jongje aan.
(and the owl flew after the boy)

Example 27 Unclear referent shift by means of a pronoun (PI-child; age 7:8)

Dianne: hij, heeft een kikker gevonden

(he (=the boy) found a frog)

Dianne: en toen toen <ehm> ging die hier der uit springen.

(and then then <ehm> he jumped out)

Dianne: →

toen zat hij te slapen.

(then he was sleeping)

In Example 27, it is not clear for a listener who does not know the Frog story and who cannot see the pictures, to know to whom the he in the last contribution is referring. As a coder we assume that a listener thinks that the he refers to the previous pronoun 'die' (that) which refers to the frog, whereas the child means the boy. The verb 'sleep' does not disambiguate the reference. A definite NP63 would have been clear. Here, we want to know whether the PI-children are as good as the N-children in the ability to establish clear referent shifts in the narrative genre. And, do they show a comparable developmental pattern with age?

14.7.2 Results: Referent Shift in narrative
As expected, the number of referent shifts (total mean N-children: 44; PI-children: 40) is much higher in the narrative than in the conversational interview genre (total mean N-children: 14; PI-children: 18). Whereas in the conversational interview genre in both populations the production of referent shifts proved to be lower than the production of referent maintenances, in the narrative genre it is the reverse (total mean N-children: 19; PI-children: 18). This means that in the narrative genre the N- and PI-children mostly talk about two or more living entities in one contribution. The amount of referent shifts is comparable in the P- and N-children as no group-

63 Note that as coders we must first figure out what the child wanted to express. This is not that difficult because the pictures are of great help. Secondly, we must identify our viewpoint with that of a listener who hears the Frog story for the first time. This is different from conversation, where we as interviewers and coders had a more identical viewpoint.
Effect\textsuperscript{64} was found. In the narrative genre the number of referent shifts linearly increases\textsuperscript{65} in both populations with age.

In the narrative genre, we also explored the ratio between definite NP as opposed to pronoun shifts. Referent shift by means of a definite NP is the pragmatically unmarked coding (Figure 14.16). Although children take a small risk of being too clear, a definite NP is the best form to establish referent shifts. We expect that with the children's age in both populations the percentage of definite NP's used for referent shifts will increase. In Figure 14.16 we see that in the PI-children (total mean: 43\%) the percentage of definite NP's is significantly\textsuperscript{66} lower than in the N-children (total mean: 49\%) except at age seven.

We found no linear age-effect, but we see that the percentage of definite NP's increases in the N-children from four to six years of age and in the PI-children from four to seven years of age. Thereafter, the percentage of definite NP's to establish referent shifts decreases, because with an onset of age seven in the N-children and with an onset of age eight in the PI-children. They seem to alternate between pronouns and definite NP's. These results are on the whole comparable to the results found by Aarssen (1996:107), although Aarssen only counted reference to the two main characters (the boy; the dog; the boy and the dog). The use of definite NP's increases from four to seven years and than decreases again from eight to ten years of age. On the basis of these results we cannot assume that the PI-children are one year delayed in comparison to the N-children, because the peak in the production of referent shifts by means of an definite NP in the seven-year-old PI-children resembles the peak observed in the 20 seven-year-old N-children from the Aarssen-population (Aarssen, 1996). A 'definite NP preference for referent shift' peak could not be observed in the German-speaking children, since seven-year-olds were not included. However, such a peak was not observed either in the six-year-olds (Bamberg, 1986). The cases in which a pronoun would have better than an NP in order not to be redundant (Grice, 1975) were very few\textsuperscript{67} in both N-children (1\%) and PI-children (3\%).

\textsuperscript{64} ANOVA: no group- or age*group-interaction effect was observed; age effect: F(4,164)=11.32, p<0.0001 (nine-year-old PI-children excluded).

\textsuperscript{65} One-way ANOVA: N-children: F(4,70)=4.65, p<0.002, \eta\textsuperscript{2}=0.21; PI-children: F(5,114)=8.60, p<0.0001, \eta\textsuperscript{2}=0.28 (nine-year-old PI-children included).

\textsuperscript{66} ANCOVA with the number of referent shifts as covariate; group effect: F(1,164)=6.58, p<0.011; age effect F(4,164)=3.90, p<0.005 (nine-year-old PI-children excluded).

\textsuperscript{67} ANCOVA with the number of referent shifts as covariate; no group- or age*group-interaction effect was observed, only an age effect: F(4,164)=3.96, p<0.004 (nine-year-old PI-children excluded).
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Figure 14.16 The percentage of definite NP calculated over all reference shifts per age group expressed by 75 N-children (Roelofs, 1998) and 120 PI-children in narrative

![Figure 14.16](image)

When pronominal shifts are used, the chance to be unclear increases (Figure 14.17), especially in the narrative genre. Eliciting a narrative by pictures triggers the use of deictic pronominal reference instead of anaphoric, cohesive pronominal reference.

Figure 14.17 The percentage of unclear pronominal shifts (calculated over the number of pronouns used to establish referent shifts) per age group expressed by 75 N-children and 120 PI-children in narrative

![Figure 14.17](image)

We see that the PI-children produce significantly more unclear pronominal shifts than the N-children, except for the seven-year-old PI-children. These percentages

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68 ANCOVA with the number of pronouns used to establish referent shifts as covariate; group effect: F(1,164)=4.45, p<0.036; age effect: F(4,164)=23.87, p<0.0001) (nine-year-old PI-children excluded).
are indeed much higher than in the conversational interview genre (PI-children: 56% compared to 16%; N-children: 33% compared to 10%) (see 13.7). In the narrative genre, we found a linear decrease with age of the percentage of unclear pronominal shifts only in the PI-children.

We looked for individual differences within age groups and populations by computing age-related cut-off points ($z \geq +1$) for the production of *unclear pronounial referent shifts* (Table 14.10). Here, we also want to detect PI-children with moderate and severe difficulties. As in the conversational interview genre, it is imperative that the listener know who is being talked about. Clear pronounial referent assignment is an absolute necessary condition in order to follow Grice's principle of being informative (1975). Unclear referents disturb the communicative interaction immediately.

Table 14.10  Children diagnosed as having too many unclear pronounial shifts per age group in 75 N-children and 120 PI-children in narrative

<table>
<thead>
<tr>
<th>Unclear pronounial referent shift</th>
<th>N-children n=75</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td>cut-off</td>
<td>n</td>
<td>cut-off</td>
</tr>
<tr>
<td>4 yrs</td>
<td>≥ 100%</td>
<td>4</td>
</tr>
<tr>
<td>5 yrs</td>
<td>≥ 89%</td>
<td>2</td>
</tr>
<tr>
<td>6 yrs</td>
<td>≥ 57%</td>
<td>2</td>
</tr>
<tr>
<td>7 yrs</td>
<td>≥ 55%</td>
<td>8</td>
</tr>
<tr>
<td>8 yrs</td>
<td>≥ 53%</td>
<td>2</td>
</tr>
<tr>
<td>9 yrs</td>
<td>≥ 53%</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td><strong>24%</strong></td>
<td></td>
</tr>
</tbody>
</table>

We see that in the seven-year-old N-children, there are eight out of fifteen children (53%) that have problems in establishing clear pronounial referent shifts. This is far more than would be expected on the basis of a normal distribution (2-3 out of 15). The rest of the N-population is normally distributed. When we look at both populations, we find a significant difference in the distribution of children that fall within the marked category. There are significantly more PI-children than N-children that have semantic/pragmatic difficulties in establishing clear pronounial referent shifts.

The following developmental pattern arises when we look at the development of referent shifts, taking into account the analysis of the Dutch-speaking 75 N-children (Roelofs (1998) and 20 N-children (Aarssen, 1996) in a picture elicited narrative.

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69 ANCOVA (polynomial contrast) with the same covariate; PI-children F(5,113)=12.87, $p<0.0001$, Linearity $p=0.0001$ (nine-year-old PI-children included).
70 Chi-square (after continuity correction)$=5.08$, df=1, $p=0.024$. 
In phase 1, four-year-old and relatively less frequently five-year-old N-children predominantly use unclear pronominal referential shifts. These pronominal shifts are mainly deictically used and therefore mostly unclear.

In phase 2, six- and seven-year-old N-children use more and more definite NP's in order to establish clear referent shifts.

In phase 3, N-children from eight to ten years start to use more clear pronominal and clear definite NP shifts alternatively.

Like in conversation (see 13.7), the PI-children show the same developmental pattern, only they produce significantly more unclear pronominal referential shifts in narrative. As in the conversational interview genre, the PI-children produce more unclear referent shifts than the N-children due to semantic or morphological/syntactic inappropriateness. The PI-children produce significantly71 more unclear referent shifts caused by semantic mismatch than the N-children. There is a significant72 linear decrease with age in both PI-children and N-children. With regards to morphological/syntactic inappropriateness, we observed that the use of zero-pronouns frequently causes unclear referent shifts. We have already discussed how zero-pronouns can be clearly and correctly used in gapping-constructions and in case of topic-drop (see 5.5 and 8.4). Here, we will examine two genre-specific constructions that frequently but not necessarily cause unclear referent shifts. We call them (1) zero-pronominal referent shift and (2) indirect voice zero-pronominal referent shift.

Firstly, in the Frog story narrative, the main characters (the boy and the dog) are searching for the frog. Sometimes children express the subject and verb of a search attempt, but leave unexpressed that it is the frog that is being sought (see 14.3.4) (Example 28).

Example 28 Referent shift by means of zero-pronouns (Pl-child; age 5.2)
(Picture: the boy standing by the window and looks for the frog)
Nickie: en dan gaat tie kijken Ø
(and then he is looking Ø)
Paraphrase: and then he (=the boy) is looking for the frog

In Example 28, the semantic role goal (frog) is left implicit by the child, who wrongly assumed that the listener will understand what the boy and dog are searching for. The verb 'kijken' (to look) in Dutch takes an optional argument. The contribution is thus not ungrammatical, but the semantic/pragmatic rules formulated

---

71 ANCOVA with the number of bare nouns + definite NP + indefinite NP shifts as covariate; group effect F(1,164)= 4.06, p<0.0001; age effect F(4,164)=10.71, p<0.0001; no Age*group interaction effect was found (nine-year-old PI-children excluded).

72 ANCOVA (Polynomial contrast) with the same covariate; N-children: F(4,69)=4.75, p=0.001, Linearity p=0.0001; PI-children: F(5,113)=6.43, p<0.0001, Linearity: p<0.0001 (nine-year-old PI-children included).
by the maxims of quantity and quality have to be followed by the narrator, making the semantic role goal explicit. We counted these instances as unclear zero-pronouns. Only if it has been made clear earlier (in one of the three previous contributions and not more)\(^{73}\) that it is the frog that is lost and must be sought, following the pragmatic rule of reducing redundancy, the thematic role (goal) or syntactic role (object) can be left implicit in the successive contribution (Example 29).

**Example 29**  Referent shift by means of zero-pronouns (PI-child; age 9.0)

Kasper: en dan opeens is de kikker, weg.
Kasper: en dan gaan ze, \(\emptyset\), zoeken

Example 30  Unclear referent shift by means of zero-pronouns in direct voice constructions (PI-child: 6.6)

Ivo:~
Semantic/pragmatic paraphrasis: the boy, said: "frog, are you, there?"
Ivo:~
Semantic/pragmatic paraphrasis: the owl, said: "oeh, oeh, no, I, y'm not it!"

Many investigators do not even mention the existence of direct voice constructions, and were unclear on whether these constructions were coded or not in their material (e.g. Aarssen, 1996). However, the decision not to code zero-pronouns will have a great influence on how to code the next referent. In Example 30, the last 'ik' (I) is correctly scored as referent shift, when the zero-pronoun referring to the owl is scored previously. When this is not done and also the zero-pronoun referring the boy is not scored, then the last 'ik' (I) will wrongly have been coded as referent maintenance.

---

\(^{73}\) This boundary is disputable. One has to start somewhere.....
In Dutch there are pragmatically correct instances of direct voice subject-drop: when the direct speech consists of more than one utterance from the same character, only the first time the narrator must explicitly mention who is the speaker (Example 31).

**Example 31** Clear referent shift by means of zero-pronouns in direct voice constructions (fictive)

| Child: | de jongen zegt | "kikker, waar ben je,"?
|        | (the boy, says) | "frog, where are you, "?
| Child:→ | Ø,             | "ben je, daar?"
| semantic/pragmatic paraphrasing: | the boy, says | "are you, there?"

With respect to the direct voice constructions used in establishing referent shifts, we observed large individual differences: 42 PI-children but only 11 N-children produce direct voice constructions in establishing referent shifts. The PI-children as a group produce significantly more referent shifts by means of a zero-pronoun (3%) than the N-children (2%) in direct voice constructions in which the main clause was totally left implicit. However, when we look at the percentage of unclear shifts by means of direct voice zero-pronouns (N-children: 11%; PI-children: 26%), we observed for both categories no significant group-effect, because of the large individual differences within age groups and populations.

Exploring the use of all unclear zero-pronoun referent shifts, including those in direct voice constructions, we did not observe a significant group effect, only an age effect: with age the percentage of unclear zero-pronouns shifts calculated over all zero-pronouns used to establish referent shifts linearly decreases with age in the N-children and the PI-children.

14.7.3 Conclusion: Referent Shift in narrative

We conclude that in the narrative genre the PI-children produce a comparable number of referent shifts to the N-children; in both populations referent shifts are more productive than referent maintenances in the narrative genre, unlike the conversational interview genre.

Furthermore, the PI-children produce significantly fewer shifts by means of a definite NP and more unclear pronominal shifts. Although more zero-pronominal shifts were used by the PI-children compared to the N-children no significant group effect was observed, because of the large individual differences within age groups. The PI-children produce significantly more unclear referent shifts caused by semantic inappropriateness compared to the N-children.

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74 Pearson's Chi-square (after continuity correction) = 8.64, df = 1, p< 0.003.
75 ANCOVA with the number of referent shifts as covariate; group effect: F(1,164)=3.96, p<0.048; no age or age*group interaction effect was observed (nine-year-old PI-children excluded).
76 ANCOVA with the number of all zero-pronouns used to establish referent shifts as covariate; age effect F(4,164)=6.61, p<0.0001 (nine-year-old PI-children excluded).
77 ANCOVA (Polynomial contrast) with the same covariate; N-children: F(4,69)=5.91, p<0.0001; Linearity: p<0.0001; PI-children: F(5,11)=4.57, p<0.001; Linearity p<0.0001 (nine-year-old PI-children included).
14.8 General conclusions: the ability to establish referential cohesion in two genres

The PI-children as a group (4;0 to 8;0 years) refer significantly more frequently to living entities in an unclear way than the N-children\(^\text{78}\) in the conversational interview genre. Surprisingly this is not\(^\text{79}\) so in the narrative genre. Only if we differentiate between referent introductions, maintenances, and shifts, can we observe that the PI-children produce significantly more unclear pronominal referents, confirming earlier results (Dijkhuis, 1994).

As we see from Figure 14.18, there is a significant linear decrease with age in the production of unclear referents (all forms: (in)definite NPs + pronouns) in both groups\(^\text{80}\) in both genres: with age the N-children and the PI-children learn how to speak about living entities by using the correct indefinite NPs in case of first mentions, the correct pronominal forms in case of a maintenance and definite NPs in case of referent shifts in both genres.

From Figure 14.18 it is clear that this ability is acquired earlier in the conversational interview genre than in the narrative genre, and that this development starts earlier in the N-children than in the PI-children. What is more, the PI-children seem more delayed in the development of clear referent assignment in the conversational than in the narrative genre.

Figure 14.18 The percentage of unclear referents calculated over all referents per age group expressed 75 N-children and 120 PI-children in conversation (C) and narrative (N)

\[\begin{array}{cccccccc}
4\text{ yrs} & 5\text{ yrs} & 6\text{ yrs} & 7\text{ yrs} & 8\text{ yrs} & 9\text{ yrs} \\
\hline
\text{N-chi: unclear referents C} & 16 & 15 & 7 & 8 & 5 \\
\text{P-chi: unclear referents C} & 22 & 14 & 14 & 12 & 13 & 5 \\
\hline
\text{N-chi: unclear referents N} & 51 & 37 & 18 & 27 & 16 \\
\text{P-chi: unclear referents N} & 50 & 35 & 28 & 24 & 20 & 17 \\
\end{array}\]

\(\text{Note: ANCOVA with the mean total number of conversational references as covariate; group effect} \ F(1,164) = 16.62, p<0.001; \text{age effect} F(4,164) = 7.50, p<0.0001; \text{no age*group interaction effect was observed (nine-year-old PI-children excluded).}\)

\(\text{Note: ANCOVA with the mean total number of narrative references as covariate; age effect} F(4,164) = 17.22, p<0.0001; \text{age*group interaction effect was observed (nine-year-old PI-children excluded).}\)

\(\text{Note: ANCOVA (Polynomial contrast) with the same covariate in conversation: N-children: age effect} F(4,69) = 9.59, p<0.0001; \text{Linear:} p<0.0001; \text{PI-children (nine-year-old PI-children included): age effect} F(5,113) = 6.95, p<0.0001; \text{Linear:} p<0.0001; \text{Cubic:} p<0.012).\)
Next we explored how many N- and PI-children produced extremely many unclear referents in the conversational and narrative genre, largely based on age-related cut-off point \((z \geq +1)\) including the N- and PI-children (Table 14.11).

Table 14.11 Cut-off point largely based on the \(z\)-scores \(\geq +1\) on the variables unclear referents in conversational and narrative

<table>
<thead>
<tr>
<th>Cut-off point unclear referents (introduction + maintenance + shift)</th>
<th>conversation</th>
<th>narrative</th>
</tr>
</thead>
<tbody>
<tr>
<td>(z \geq +1) (z \geq +1) (z \geq +1) (z \geq +1)</td>
<td>(\geq 24)% (\geq 24)% (\geq 75)% (\geq 59)%</td>
<td>(\geq 10)% (\geq 9)% (\geq 35)% (\geq 32)%</td>
</tr>
<tr>
<td>4 yrs</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>5 yrs</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>6 yrs</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>7 yrs</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>8 yrs</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>13</td>
</tr>
</tbody>
</table>

Note that in the seven-year-old N-children there are too many children that fall within the marked category (conversation: 27%; narrative: 27%). In a normally

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**ANCOVA** (Polynomial contrast) with the same covariate in narrative: N-children: age effect \(F(4,69)=8.16, p<0.0001\); Linearity: \(p<0.0001\); PI-children (nine-year-old PI-children included): age effect \(F(5,113)=9.76, p<0.0001\); Linearity: \(p<0.0001\).
distributed N-population there very well might be some children (<18.3%) that have 'low scores' on a certain variable, but in the seven-year-old N-children there are too many that have clear pragmatic referential problems. A comparison between the seven-year-old PI-children and N-children is therefore difficult, since clear patterns of deviant behaviour are more difficult to detect.

Next, we look at the N- and PI-children that have the same problems with clear referent assignment in both genres. We see that this is a smaller group of N-children (7%) than PI-children (13%). Especially in the P-population, there are many six- to eight-year-olds that have only problems in the establishment of clear reference assignment in the conversational interview genre. Probably, to have social (linguistic) contact with an interviewer is more difficult for some PI-children than to tell a narrative on their own. As we see, there are three times as many individual PI-children (n=79) than N-children (n=24) that produce extremely many unclear referents in one of the two genres. This difference proved to be highly significant.

The PI-children produced significantly more unclear referents due to morphological/syntactic (e.g. zero-pronouns in an obligatory argument position) and/or semantic inappropriateness (e.g. semantically mismatched noun-phrases). While the PI-children are at the age of learning to apply certain pragmatic rules, they are still suffering from not having developed the correct morphosyntactic and semantic tools to work with. The PI-children were frequently not explicit enough since they left referents unexpressed, used bare nouns that do not contain essential pragmatic information or produced semantically inappropriate NP's. As well as having these problems, they also frequently failed in the correct application of certain pragmatic rules for referent assignment, and wrongly used, for instance, the pronoun 'he' for referring successively to two different male entities.

Thus, what causes the unclarity in the N-population and in the P-population is different in both genres. The N-children more frequently produce the morphologically/syntactical and semantically correct form. What causes the unclearness is a failure in the correct application of semantic/pragmatic rules. The N-children are still developing the application of these rules between age four and eight. At age eight a considerable number of N-children still have difficulties with the semantic/pragmatic rule of taking the listener's perspective into account, and with making the correct presuppositions about what the interviewer is assumed to know on the basis of the given linguistic information or on the basis of the interviewer's world knowledge. The PI-children prove to have even more difficulties of this kind in both genres plus the morphosyntactic and semantic difficulties mentioned above.

Another remarkable fact is that the N-children, especially the six-year-olds, in both genres produce more referents by means of a definite NP that were coded as too clear/redundant than the PI-children. The N-children are thus more explicit than necessary, and frequently failed to apply the semantic/pragmatic rule not to be redundant. However, in all these cases for the investigator it was clear about what

81 Chi-square (after continuity correction)=19.86, df = 1, p< 0.0001 (nine-year-old PI-children included).
The ability to tell a narrative

living entity the child was speaking. The fact that we observed this pragmatic 'failure' in the PI-children less frequently than in the N-children, showed that the PI-children are far more implicit and not even reach the level of overgeneralization of the semantic/pragmatic rule: 'be explicit'.

In general, the pragmatic impact of the difficulties in the correct use of referential cohesive devices by the PI-children should not be underestimated. The PI-interviewers are frequently confronted with information units on all levels that are not clearly morphologically/syntactically and semantically/pragmatically linked to each other. In less severe cases, the PI-interviewers still had to make considerable effort to compute what the PI-children mean; in the worse cases the PI-interviewers, for instance, did not understand what living entity the PI-children exactly were talking about. When with this computational effort still not everything is clear, this can easily lead to feelings of impatience, being bored etc. We might expect the same negative feelings in other people that have to communicate with the PI-children in everyday life. Unclear referent assignment plays an important part in this and may negatively influence the communicative interaction with the PI-children.

14.9 General conclusions: the ability to tell a narrative

The PI-children have difficulties in embedding the beginning of the narrative in time and in expressing the most important plot elements. This seems to be related to an underdeveloped concept of the narrative as a whole. The results also indicate that the PI-children have difficulties in narrating causally related actions according to an underlying internally made plan. As a group the PI-children seem to have a semantic/pragmatic disorder in expressing causality in a narrative (e.g. Bishop, 2002). These results are comparable to earlier findings in autistic PI-children (Tager-Flusberg, 1995) and PI-children on the autistic spectrum and with pervasive developmental disorders (Capps, Losh and Thurber, 2000). The use of complex morphosyntax is an important tool that enables narrators to mark causal distinctions between story events. Although from five years on, English-speaking N-children begin to use complex syntax, such as subjunctions like 'because', to impose a causal narrative hierarchy (e.g. Karmiloff-Smith, 1985), the Dutch-speaking N- and PI-children used too few narrative causal conjunctions to be able to carry out statistical analysis (see 9.6.2). Although they can use causal conjunctions in the Frog story narrative, this type of complex morphosyntax seems rather limited in both N- and PI-children. The expression of causality also requires perspective taking and causal understanding of human behaviour.

We did not find that the PI-children as a group produced significantly more unclear referents than the N-children. This may be due to the large individual differences between the children inside the groups. These differences were even greater in the narrative genre than in the conversational interview genre. The pictures in the narrative task might also have encouraged the PI-children to express a clear referent by means of an NP. However, significantly more PI-children (n=79; 66%) than N-children (24; 32%) produced too many unclear referents in both genres. When we
differentiate between first and subsequent mentions, we observe that there are significantly more PI-children (n=14; 12%) than N-children (n=5; 7%) that have severe semantic problems in establishing clear referent NP-introductions. There also are significantly more PI-children (n=49; 41%) than N-children (n=18; 24%) that have difficulties in establishing clear pronominal referent shifts.

When we look at complexity, we observed that the PI-children followed the thematic subject-strategy more than the minimal distance strategy, and they are comparable in this respect to the N-children as a group. Both strategies for clear referent maintenance, however, were used significantly less frequently by the PI-children than by the N-children. We found also that a substantial percentage of unclear coreferential cohesion was caused by morphological/syntactic and/or semantic inappropriateness.

The difficulties in embedding the start of the Frog story in time, in narrating all plot elements, and in establishing clear co-referential cohesion all confirm that the PI-children, as a group, have severe impairments in telling a cohesively and coherently clearly linked narrative.
15 Deeper exploration of the comorbid relation between LI and PI

Claudia Blankenstijn and Annette Scheper

15.1 Introduction
In the previous chapters, we have described in detail in what ways the PI-children are morphologically/syntactically disordered. We have also described their semantic/pragmatic difficulties. The co-occurrence rate when taking grammatical ability is 82% LI in 120 PI-children (see 4.2 and 4.3). These children also have a problem with semantics/pragmatics (see 3.5.2). The comorbidity rate is far higher than in previous studies because these older studies did not include the area of semantics/pragmatics (see 1.3.3). The co-occurrence rates reported in these studies were based on more global language measures and were approximately 50% (see 1.4). The detailed analysis and the inclusion of both conversational and narrative genres in this study results in higher comorbidity rates.

Our results clearly confirm that PI-children have a high prevalence of language disorders. However, it is not possible to explore the causes of LI in the PI-children from these data. On the basis of the discussion of theories of linguistic and social-cognitive development (see 2.3), two main relationships became apparent: LI interacts with PI or LI causes PI. It could also be the case that different types of PI can have a different relationship to LI (Prizant, 1999). If LI causes PI, then LI must occur prior to PI. Here, we will explore this possibility by looking at the LI history of the PI-children by using data from a parental checklist (see 15.2.1).

Another way of exploring the relationship between LI and PI is to examine specific types of LI in relationship with specific types of PI, as defined in 3.2.2. Here, we want to explore how many of the four diagnostic groups of PI-children show both morphological/syntactic (MS) and semantic/pragmatic (SP) interdependent MS and SP difficulties. The group that has both interrelated MS and SP difficulties will be necessarily smaller than when the group of PI-children was diagnosed as having difficulties in the area of MS or SP separately.

First, we present the detection of LI using methods other than spontaneous language analysis (15.2), by the use of a parental checklist (15.2.1) or language testing (15.2.2). The comorbidity rates based on these different methods and the consequences for further research will be discussed (15.2.3). Next, we will give a summary of the characteristics of morphological/syntactic (MS) and semantic/pragmatic (SP) (language) impairment based on the spontaneous language analysis (15.3). These MS and SP LI characteristics served as input for the development of four specific dimensions of extreme LI (15.4). Here, we explore the relationship between a specific profile of MS and SP LI based on four dimensions and a specific psychiatric disorder, such as an internalizing and externalizing disorder (15.5). Lastly, we will end with the general conclusions, methodological considerations and recommendations (15.6).
15.2 Detection of LI using other methods

Language (dis)abilities can be detected in many different ways. In addition to the spontaneous language analysis we used a Parental Checklist (Blankenstijn and Scheper, 1993) and a language test (TvK, Van Bon and Hoekstra, 1982; see 3.2.3) in order to detect LI in the PI-children. We will discuss how the use of different methods results in different comorbidity rates.

15.2.1 Parental Checklist

The parental checklist was described in 3.2.3. The parents of 18 PI-children (15%) did not fill in this checklist, resulting in etiologic information being available for 102 PI-children. In total, 49 PI-children were judged as LI by their parents. These 49 PI-children are spread over the different PI types (see Table 15.1). The results with respect to the subtypes of internalizing and externalizing PI are not presented in this table, whereas the subtypes of PI-children with both characteristics of PI under the heading of 'Both' are separately presented. The PI-children with PDD-NOS proved to be the largest group of PI-children that were identified as having language difficulties by their parents. This diagnostic group has a very clear cluster of psychiatric symptoms in contrast to the PI-children with 'No Diagnosis'.

<table>
<thead>
<tr>
<th>PI-children</th>
<th>PDD-NOS</th>
<th>No Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>n = 102</td>
<td>8 (23%) LI in 26 PI</td>
<td>8 (42%) LI in 19 PI</td>
</tr>
</tbody>
</table>

Table 15.1 Number of PI-children with a specific PI that are judged as LI on the basis of a parental checklist (Blankenstijn and Scheper, 1993)

From Table 15.1, it also becomes clear that parents of PI-children with externalizing PI have difficulties in identifying the LI in their PI-children. This result confirms earlier reports in the developmental literature that externalizing PI-symptoms frequently overshadow the LI-symptoms (e.g. Prizant, 1990; Cohen et al., 1998). Parents are considered expert informants about PI-children's language abilities on the basis of a detailed parental interview (Prizant, 1999). These results suggest, however, that on the basis of a checklist parents lack enough expertise to diagnose language disorders in their own PI-children. Many parents seem to be unaware of the language disorders in the PI-children, since the overall co-occurrence rate of 48% LI in PI-children is relatively low in comparison to the co-occurrence rates of at least 82% LI in PI-children based on the detailed morphological/syntactic and semantic/pragmatic analysis. This finding implies that at least 34% of these 102 PI-children¹ have undetected language disorders before referral. The existence of such a group was first reported by Cohen and colleagues (1998). In order to detect this

¹ We found 82% to 100% LI in 102 PI-children. The parents detected 48% LI in 102 PI-children. Thus, (82% to 100%) minus (48%) = (34% to 52%) of these 102 PI-children have an undetected LI.
Deeper exploration of the comorbid relation between LI and PI children, detailed linguistic testing and parental education/advice on language disorders are necessary in the future.

15.2.2 Language Testing
The test used was described in 3.2.3 together with the results. Here, in Table 15.2, we present what extent language disorders were detected in the areas of morphology/syntax and semantics/pragmatics on the basis of the language test. The 120 PI-children are divided into PI-children with internalizing and externalizing disorders or both (PI-children with PDD-NOS or 'No Diagnosis'). Note that one PI-child can have deviant scores on one or more subtests (not depicted in Table 15.2).

From Table 15.2 we see that PI-children with 'No Diagnosis' perform relatively well, followed by internalizing/externalizing PI. PI-children with PDD-NOS deviate particularly on both receptive and productive language subtests. Additionally, we computed that 25 (21%) PI-children with PDD-NOS show significantly lower scores on the language subtests (2) judgment of grammaticality ($p<.04$) and (4) word production ($p<.006$) compared to the PI-children with other specific types of PI. These results fit into the general description of PI-children with PDD-NOS. Since they are assumed to have a delay in development on all levels, it is of no surprise that they proved to have more difficulties in the area of language and intellectual social-cognitive functioning than the other PI-children.

<table>
<thead>
<tr>
<th>Morphology/syntax tested (TvK)</th>
<th>%LI in 120 PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total LI</td>
<td>Internalizing</td>
</tr>
<tr>
<td>(2) judgement grammaticality</td>
<td>17</td>
</tr>
<tr>
<td>(5) sentence production</td>
<td>18</td>
</tr>
<tr>
<td>Semantic/pragmatics tested (TvK)</td>
<td></td>
</tr>
<tr>
<td>(1) lexical choice</td>
<td>17</td>
</tr>
<tr>
<td>(4) lexical production</td>
<td>8</td>
</tr>
<tr>
<td>(3) implicit meaning</td>
<td>14</td>
</tr>
</tbody>
</table>

Since some PI-children deviated on more than one subtest, we computed that 7% to 18% of all PI-children have language disorders based on the test results, leading to a

2 Tukey-HDS Procedure (one way).
3 Scores on the subtest for 'implicit meaning' were only available for 77 PI-children (see 3.2.3).
mean comorbidity rate of 13% LI in 120 PI-children. The children with PDD-NOS have the greatest number of problems according to the test results. The comorbidity rates discovered through language testing turn out to be far lower than the rates found by the parental checklists.

A possible explanation for this discrepancy is that the language subtests only identify language skills at the word and sentence level, whereas in the checklist language skills beyond the sentence level are identified, based on spontaneous language in real time. These language skills are far more complex than the language skills measured with the language subtests.

Within the language areas of morphology/syntax and semantics/pragmatics only very specific, limited language skills are tested. For example, in the area of semantics many items concern the retrieval of lexical information that involves the activation of only four semantic fields (receptive lexical choice) or one semantic field (lexical production) (see 3.2.3). The analysis of semantic skills in spontaneous language places higher demands on the child's ability to retrieve lexical information, since the time pressure is greater and many semantic fields have to be combined. The fact that relatively many PI-children with receptive and relatively few PI-children with productive disorders are detected seems again related to the test design: the receptive semantic subtest is more difficult than the productive semantic subtest at the word level. We suggest that these factors in the test results cause the low comorbidity rates.

However, as stated in 3.2.3 a receptive language test is the only assessment tool that can be used to detect receptive language disorders. Although one might assume that relatively few (at most 28%) PI-children have receptive LI based on language test results and relatively many (at least 82%) based on spontaneous language analysis have productive LI, this is not the case. The reason why this assumption is wrong is that, as stated above, the receptive subtests used are limited to the word and sentence level. If receptive language skills had been measured beyond the sentence level, we would expect that higher co-occurrence rates would have been found. We suggest that the 120 PI-children have more receptive LI than was detected due to the problems of testing receptive skills at a deeper level.

15.2.3 Comorbidity rates compared

Using standard language tests only a relatively small amount, that is 13% of LI in PI-children could be identified. From Table 15.2 we see that morphological/syntactic LI exists in 17 to 18 of the 120 PI-children (14% to 15%); Semantic LI in 8 to 17 of all 120 PI-children (7% to 14%). We also observed pragmatic LI in 14 of 77 PI-children (18%). When parents judge PI-children as being language-impaired, the co-occurrence rates increase to 45% of LI in PI-children. As part of the answer to main research question 1 (see 2.5), we must conclude that only when co-occurrence rates are based on spontaneous language analysis, relatively high co-occurrence rates are found (at least 82%) (see also 1.4). Using language testing or a parental checklist means that the LI in a substantial group of PI-children (between 87% and 52%) remains undetected. A language test should still be included, however, in the language assessment procedure in order to detect receptive language disorders.
LI-symptoms can be overlooked or easily be wrongly classified as symptoms of PI, leading to inadequate diagnosis and treatment (see 1.3.3 and 1.3.4). Clinicians that work with PI-children with undetected LI can overlook their communicative problems since communicative difficulties negatively affect the social relationship between the communicative partners, and come across as abnormal social-cognitive functioning. They might also interpret these language impairments as internal or external PI-symptoms. We argue that detailed language and communication diagnosis and therapy should be one dimension of an integrated intervention plan for PI-children in the future (see also Prizant, 1999).

15.3 Summary of morphological/syntactic and semantic/pragmatic LI in PI-children

On the basis of the detailed spontaneous language analysis some variables showed very clear differences between the PI-children and the N-children. In answer to main research question 1a and 2, i.e. to what extent do Dutch-speaking PI-children have specific language problems in the area of morphology/syntax (1a), when we compare both genres (2), the following can be said. We found significant group differences in the grammaticality and clustering of grammatical errors in the conversational genre; the PI-children frequently have missing lexical categories, such as obligatory verbs, verbal arguments, prepositions and adverbs, contributing to a fragmentary information exchange. Additionally, PI-children make too many errors with the selection of the semantically correct preposition. Selection errors of adverbial expression, particularly adverbs of manner, are very evident in PI-children. They also show many word order errors, especially in sentences with topicalization that need inversion of the subject and the verb. PI-children show problems in deciding which grammatical and semantic information is sufficient for the information exchange in a conversation. The realization of functional categories is also difficult for PI-children: they make more errors in the marking of the simple past tense marking and in establishing agreement relations between the subject and the verb and the determiner and the noun. Low complexity is widespread among PI-children; this is characterized by reduced and embedded clauses that were less correctly formed. PI-children prefer to use non-transitive verbs, such as intransitives and copula verbs, giving only static descriptions instead of related events. Additionally, they use more telic split and semantically light verbs. The morphological/syntactic problems are even more evident in the more complex narrative genre: PI-children show more difficulties with grammaticality, temporality, transitivity, agreement and the ability to package morphologically/syntactically than in the conversational genre.

In the area of semantics/pragmatics, in answer to main research question 1b and 2, i.e. to what extent do Dutch-speaking PI-children have specific language problems in the area of semantics/pragmatics (1b), when we compare both genres (2), the following can be said. We observed that in the conversational genre PI-children have turn taking difficulties, such as problems in producing long turns, a long coherent turn, and taking turns smoothly without pauses or interruptions. They have
difficulties in being responsive, since they give many minimal responses and frequently had to be asked to clarify unintelligible old information. They ask too many requests for information, but too few requests for clarification. With respect to topic management, they frequently repeat old information and when expressing new information, use the strategy of topic shading. Talking about one topic in more detail seems problematic. With respect to linking sentences coherently and cohesively, the PI-children significantly violate the Maxims of Grice (1975) more frequently, especially the Maxim of Manner/Quality and they express too many unclear referents. In the narrative genre, they have difficulties with the narrative task, in marking the beginning of the story and in narrating the plot, expressing sufficient planning components and with establishing clear co-referential cohesion, especially by means of indefinite NPs and (zero) pronouns; the conversation seemed to be more difficult in this respect than the narrative. The problems with making clear reference were frequently based on difficulties in the areas of morphology/syntax and semantics and this was more evident in the PI-children than in the N-children.

According to the Explanatory Criterion (Burisch, 1984) that uses significant group-effects to classify deviant behaviour from normal behaviour, we can select the interrelated MS+SP variables that reflect a significant difference in the area of both morphology/syntax and semantics/pragmatics (Table 15.3). Many of these variables are also mentioned in the developmental literature as features of LI. We will use these variables for a deeper exploration of the comorbid relationship of LI and PI in answer to main research question 3, i.e. is there a relationship between specific language disorders in both genres with specific psychiatric disorders (3)? The exploration of comorbidity using both MS and SP variables is necessary to detect the possible relationship between specific language disorders with specific psychiatric disorders. Here, we want to know whether there is a relationship between specific profiles of morphological/syntactic and semantic/pragmatic impairments with specific types of psychiatric internalizing and/or internalizing disorder.

We want to investigate how many of the four types of PI-children show both morphological/syntactic (MS) and semantic/pragmatic (SP) difficulties. We know that many LI-children show uneven profiles, i.e. they may resemble younger N-children in some aspects of language use but not in others (Leonard, 1996). These uneven profiles can differ in groups of LI-children; some children apparently have only a problem in grammar, named Grammatical Specific LI (e.g. Rice, 1993; Van der Lely, 1994); others have only problems in semantics/pragmatics, called (semantic-)pragmatic LI (e.g. Bishop, 1997) (see 1.2). It is possible that language profiles also differ in different specific types of PI-children. By means of a dimensional representation of LI the relationships between various aspects of interrelated MS+SP variables with diagnostic subgroups of PI-children can become more clear.
Deeper exploration of the comorbid relation between LI and PI

Table 15.3  MS and SP variables that mostly contribute to significant differences between the PI- and the N-children in the conversational and narrative genre

<table>
<thead>
<tr>
<th>Group differences in the conversational (C) and narrative (N) genre</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Markers of Morphological/syntactic (MS) LI</td>
<td>Markers of Semantic/pragmatic (SP) LI</td>
</tr>
<tr>
<td>Ungrammatical T-units (C)/(N)</td>
<td>Mean Length of Turn (MLT) (C)</td>
</tr>
<tr>
<td>Grammatical errors (C)/(N)</td>
<td>Length of Longest Turn (LLT) (C)</td>
</tr>
<tr>
<td>Clustering of grammatical errors (C)</td>
<td>Interruptions (C)</td>
</tr>
<tr>
<td>Gap &gt; 4 seconds (C)</td>
<td></td>
</tr>
<tr>
<td>Missing lexical verbs (C)/(N)</td>
<td></td>
</tr>
<tr>
<td>Missing ungrammatical subjects/ objects (C)/(N)</td>
<td>Missed turn chances (C)</td>
</tr>
<tr>
<td>Missing prepositions/ adverbs (C)</td>
<td>Extended discourse with narrative character (C)</td>
</tr>
<tr>
<td>Topic drop subject/ object (C)/(N)</td>
<td>First pairparts expressed by the children (C)</td>
</tr>
<tr>
<td>Preposition and adverbial errors (C)</td>
<td>Minimal responses (C)</td>
</tr>
<tr>
<td>Word order errors (C)</td>
<td>Topic hold expressed by the children (C)</td>
</tr>
<tr>
<td>Topic link expressed by the children (C)</td>
<td></td>
</tr>
<tr>
<td>Past tense marking errors total (C)/(N)</td>
<td></td>
</tr>
<tr>
<td>Past tense errors in extended discourse (C)</td>
<td>Unmarked topic shift/ ignoring initiation (C)</td>
</tr>
<tr>
<td>Subject-Verb agreement errors total (C)</td>
<td>Different content/ intention (C)</td>
</tr>
<tr>
<td>Number marking agreement error (C)</td>
<td>Gaps/ Jumps (C)</td>
</tr>
<tr>
<td>Missing determiner-noun agreement error (C)</td>
<td>Repetition/ Elaboration/ Reiteration (C)</td>
</tr>
<tr>
<td>Ambiguous information (C)</td>
<td></td>
</tr>
<tr>
<td>Ellipsis (C)</td>
<td></td>
</tr>
<tr>
<td>Conjunction reduction error (C)</td>
<td>Erroneous Ellipsis (C)</td>
</tr>
<tr>
<td>Embedded clause error (C)</td>
<td>Erroneous Conjunction (C)</td>
</tr>
<tr>
<td>Obligatory/ optional object verbs (C)/(N)</td>
<td>Unclear referent total (C)/(N)</td>
</tr>
<tr>
<td>Intransitive verbs (C)/(N)</td>
<td>Unclear introduction/ maintenance/shift (C)/(N)</td>
</tr>
<tr>
<td>Copula verbs (C)/(N)</td>
<td>Too clear maintenance (C)/(N)</td>
</tr>
<tr>
<td>Split verbs (C)/(N)</td>
<td>Total Planning components (N)</td>
</tr>
<tr>
<td>Light or GAP verbs (C)/(N)</td>
<td></td>
</tr>
</tbody>
</table>

15.4 Specific Dimensions of LI in PI-children
We want to explore whether the morphological/syntactic and semantic/pragmatic variables can be combined into different dimensions. We therefore used raw scores of both N- and PI-children on the selected variables (see Table 15.3) in order to detect specific correlations between performances on specific variables using a factor analysis. For instance, we explored whether high scores on the variables
missing ungrammatical subject and object arguments correlate with high scores on the variable unclear referent introductions, maintenances and shifts. This possible relationship in incorrect MS and SP behaviour was frequently suggested in the previous chapters (see 5.3 and 5.4; 13.4 to 13.8). The only difference with other correlation measures is that in a common factor analysis all scores on all selected variables are used, and the clustering of performances cannot be controlled in advance. The clustering of performances may result in a different dimension. Each dimension reflects a specific clustering of MS and SP LI characteristics.

We carried out a Common Factor Analysis followed by Varimax rotation (Gorsuch, 1983; Van den Brink and Koele, 1987:50) in order to explore a dimensional representation of LI with correlated morphological/syntactic (MS) and semantic/pragmatic (SP) variables in both genres. The final factor solution was used to define specific language dimensions. Each dimension reflects specific language impairment characteristics. The performances of the N-children were also included in order to prevent the effect of restricting the range of scores on factor analysis (see Gorsuch, 1983).

Based on eigenvalue >1 and the scree-test, criteria solutions with 4-8 factors were examined. In order to arrive at a solution with 'pure' factors, the variables with loadings <.30 were deleted and also those variables that are the only variable of a separate factor in the 8-factor solution; after deletion the factor analytic procedure was repeated. Finally, a 4-factor solution proved to be the best resulting in four different dimensions of LI. In these dimensions both morphological/syntactic and semantic/pragmatic impairment characteristics were combined in a way that fits with a logical, conceptual relationship between the interrelated MS and SP variables (Table 15.4).

The LI Dimensions are ordered from more severe to less severe: Dimension I and II reflect 'many language errors' and Dimensions III and IV reflect 'low language complexity'.
Table 15.4 Four specific MS and SP Dimensions of LI in PI-children

<table>
<thead>
<tr>
<th>Four Morphological/Syntactic (MS) and Semantic/Pragmatic (SP) LI Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimension I: Disability in being explicit in the conversational interview</strong></td>
</tr>
<tr>
<td>- many morphological/syntactic errors in lexical and functional categories (realizing a complete argument structure, tense and agreement marking) (MS)</td>
</tr>
<tr>
<td>- many unclear referents (too many unclear referent shifts) (SP)</td>
</tr>
<tr>
<td><strong>Dimension II: Disability in being explicit in the narrative</strong></td>
</tr>
<tr>
<td>- many morphological/syntactic verb errors and low verb complexity (MS)</td>
</tr>
<tr>
<td>- many morphological/syntactic errors in lexical and functional categories (realizing a complete argument structure, tense and agreement marking) (MS)</td>
</tr>
<tr>
<td>- many unclear referents (too many unclear referent maintenances and shifts) (SP)</td>
</tr>
<tr>
<td><strong>Dimension III: Disability in being relevant in both genres</strong></td>
</tr>
<tr>
<td>- low verb complexity in both genres: too many GAP/Light and intransitive verbs (MS)</td>
</tr>
<tr>
<td>- many conversational incoherencies: too many jumps and gaps (SP)</td>
</tr>
<tr>
<td>- low narrative complexity in both genres: too little plot elements and extended discourse with a narrative character (SP)</td>
</tr>
<tr>
<td><strong>Dimension IV: Disability in being responsive in the conversational interview</strong></td>
</tr>
<tr>
<td>- low verb complexity (MS)</td>
</tr>
<tr>
<td>- many minimal, elliptical and incoherent answers (SP)</td>
</tr>
</tbody>
</table>

To further explore the relationship between four dimensions of MS and SP LI and the four diagnostic groups of PI-children, we defined an abnormal score. This was the completely standardized factor score (z-score) > 1.0. This score identifies a clinically very significant type of MS and SP LI on one or more of the four dimensions. In this experimental research, we tried to discover a deviant pattern that reflects interrelated problems of MS and SP. Many difficulties in the area of morphology/syntax (Chapter 4 to 9) were frequently thought to be related to the problems in the area of Semantics/Pragmatics (Chapter 10 to 14). This attempt to correlate specific MS and SP variables is exploratory in nature.

A subgroup of PI-children had interrelated abnormal scores on one or more of the four dimensions: 37% (n=44) of all 120 PI-children showed a highly significant LI. This group was labelled as having extreme language impairment (LI-E). Most PI-children, but not all, of the remaining subgroup of PI-children (63%) can still be diagnosed as having LI, but not as having extreme LI, based on the four specific dimensions of LI as presented in Table 15.4.
Now that the four dimensions have been established, we will see how these correlate with the specific types of PI as set out in 3.2.1. This will of course be done on the basis of the 44 PI-children with extreme LI who fit into one or more of the dimensions.

### 15.5 Extreme LI in different diagnostic groups of PI-children

We found significant differences between the four diagnostic groups of PI-children on each of these four dimensions (Table 15.4). In Table 15.5, we present the percentages of PI-children of the four different diagnostic groups that proved to have extreme LI on one or more dimensions. These groups were ordered from the lowest prevalence of extreme LI in PI-children with Internalizing disorders to the highest prevalence in PI-children with PDD-NOS.

<table>
<thead>
<tr>
<th>Total PI-children (n=120)</th>
<th>Internalizing PI-children (n=41)</th>
<th>PI-children with 'No Diagnosis' (n=22)</th>
<th>Externalizing PI-children (n=32)</th>
<th>PI-children with PDD-NOS (n=25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>44 (37%) extreme LI</td>
<td>6 (15%)</td>
<td>7 (32%)</td>
<td>16 (50%)</td>
<td>15 (60%)</td>
</tr>
<tr>
<td>LI Dimension I</td>
<td>0 (0%)</td>
<td>1 (4.5%)</td>
<td>3 (9.4%)</td>
<td>3 (12%)</td>
</tr>
<tr>
<td>LI Dimension II</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>3 (9.4%)</td>
<td>2 (8%)</td>
</tr>
<tr>
<td>LI Dimension III</td>
<td>4 (10%)</td>
<td>1 (4.5%)</td>
<td>6 (18.6%)</td>
<td>4 (16%)</td>
</tr>
<tr>
<td>LI Dimension IV</td>
<td>1 (2.5%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (4%)</td>
</tr>
<tr>
<td>Combination of Dimensions</td>
<td>1 (2.5%)</td>
<td>5 (23%)</td>
<td>4 (12.4%)</td>
<td>5 (20%)</td>
</tr>
</tbody>
</table>

From Table 15.5 we see that 44 PI-children with different types of psychiatric disorders have extreme LI on one or more of the four dimensions. Many PI-children, however, have extreme LI on more than one dimension (under the heading of 'Combination of Dimensions in Table 15.5').

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4 Dimension I: F(4,115) = 2.88, p<0.026; Dimension II F(4,115) = 3.65, p<0.008; Dimension III F(4,115) = 2.34, p<0.059; Dimension IV F(4,115) = 3.09, p<0.018.
When we compare the rates of extreme LI within the four diagnostic groups of PI-children, the comorbidity rates in the PI-children with internalizing PI (15%) turn out to be relatively low compared to the rate in PI-children with 'No Diagnosis' (32%), followed by the rates in PI-children with externalizing PI (50%). The rates in PI-children with PDD-NOS are the highest (60%). This last result is to be expected on the basis of the language test results (see 3.2.3) and IQ rates (see 3.2.1).

When we look at the frequencies of abnormal scores on the four LI dimensions within the diagnostic groups (Table 15.5), it is clear that some PI-children only deviate on one specific LI dimension, while others seem to deviate on a specific combination of dimensions. The characteristics of extreme LI in the four groups of PI will be discussed below. This presentation is ordered from low to high comorbidity of extreme LI in specific PI.

**Extreme LI in PI-children with internalizing PI**

From the 41 PI-children with internalizing PI, such as Depression and Anxiety Disorders (see 3.2.1), only 6 (15%) have extreme LI; most of them show abnormal scores on dimension III. That is to say, the extreme LI in this diagnostic group is characterized by a typical MS and SP language impairment profile; these PI-children show low verb complexity in both genres, as they use many light verbs with low semantic loading and relatively many intransitive verbs that take no obligatory (indirect) object, whereas they do not produce enough obligatory object verbs. Furthermore, these PI-children make many conversational incoherencies, such as jumps and gaps. Some of them proved to have difficulties in estimating the relevance of the interviewer's conversational contributions, resulting in many interruptions or ignored initiations. Most of them express few narrative plot elements (narrative genre) and not enough extended discourse with a narrative character (conversational genre).

**Extreme LI in PI-children with 'No Diagnosis'**

From the 22 PI-children with 'No Diagnosis', having a psychiatric impairment characterized by both externalizing and internalizing symptoms (see 3.2.1), only 7 (32%) have extreme LI; most of them have abnormal scores on a combination of dimensions. That is to say, the extreme LI in this diagnostic group shows no typical MS and SP language impairment profile. The PI-children with 'No Diagnosis' and extreme LI show all the characteristics of the different dimensions in any combination.

**Extreme LI in PI-children with externalizing PI**

From the 32 PI-children with externalizing disorders, such as Oppositional Disorder or ADHD (see 3.2.1), 16 (50%) PI-children have extreme LI; most of them show abnormal scores on dimension III, followed by abnormal scores on dimension I and II. Some of these PI-children also show abnormal scores on a combination of dimension I, II and III. The PI-children with externalizing PI have more severe morphological/ syntactic and semantic/pragmatic difficulties in both genres. These PI-children do not only show a language complexity that is low for their age. They also make
morphological/syntactic errors in realizing lexical categories, such as explicating verbal arguments, and in realizing functional categories, such as tense and agreement marking. These PI-children express many unclear referents, especially too many unclear referent shifts.

**Extreme LI in PI-children with PDD-NOS**

From the 25 PI-children with PDD-NOS (see 3.2.1) 15 (60%) of the PI-children show extreme LI; most of them show abnormal scores on dimension III, followed by I and II; 5 PI-children with PDD-NOS show abnormal scores on a combination of the dimensions I, II and III. These PI-children show abnormal scores on the same dimensions as the PI-children with externalizing PI.

In answer to main research question 3 and subquestion 3, we confirm that there are specific combinations of abnormal scores on one or more different dimensions, further referred to as Language Impairment Profile (LI Profile), in the four diagnostic groups of PI-children. However, these specific Language Profiles only differentiate the degree of severity of an extreme LI. First, abnormal scores on more than one dimension are judged as relatively more severe than abnormal scores on only one dimension. Second, abnormal scores on dimension I and II that indicate many MS and SP errors mostly lead to a relatively more severe disturbance of the communicative interaction than abnormal scores on dimension III and IV that indicate low MS and SP complexity.

We showed that PI-children with PDD-NOS and externalizing disorders are relatively most impaired on dimension I, II and III, unlike PI-children with internalizing disorders who are relatively less impaired, namely only on dimension III. Lastly, PI-children with 'No Diagnosis' show no specific Language Profile. The LI Profiles of PI-children with internalizing PI on the one hand and PI-children with externalizing PI on the other most clearly differed from each other. This analysis suggests that on the basis of Language Impairment in general the division of larger psychiatric populations into PI-children with internalizing and externalizing disorders is also well motivated (Morrison and Anders, 1999; Verhulst and Verheij, 2000; Mesman and Koot, 2002) (see also 1.2). Our results contradict previous results that semantic-pragmatic LI is associated with PI, especially with disorders on the autistic spectrum (Bishop, 1989; Bishop et al., 2000).

On the basis of multifaceted micro-analyses, we are only beginning to understand how the linguistic rules of different language areas are related to one another. Some MS and SP (dis)abilities are inextricably linked in PI-children; other MS and SP problems seem more independent. Researchers should not only focus on local disruptions in the MS and/or SP system, but should take the whole language system into account, or at least, should place observed error patterns into the big picture.
15.6 General conclusions

In interpreting our findings, it is important to bear in mind some methodological limitations of the study. First, the sample size is relatively large compared to other studies that also involve labour-intensive micro-level analysis. However, in order to answer question 3, an even larger sample size would have been needed in order to detect similarities in abnormal patterns of language behaviour in PI-children with specific psychiatric impairments. The individual variability in language abilities is great in N-children, but the diversity in language (dis)abilities proved to be greater in LI-children and LIPI-children. It might be even greater in LI(PI)-children with semantic/pragmatic LI than with morphological/syntactic LI (e.g. Rapin and Allen, 1983; Smith and Leinonen, 1992; Roelofs, 1998). We were, however, dependent on the inflow of PI-children referred to the clinic (see 3.2.2). The children were also taken into the project before the PI-diagnosis was known. Some groups of PI-children with specific types of PI proved to be rather small in the end. The PI-children with Depression Disorder, for instance, finally proved to be a small group (n=8) that we had to incorporate into the group of PI-children with internalizing disorders in order to find a specific pattern of LI-symptoms.

Second, it is necessary in future work to evaluate more carefully the role of other variables that might have influenced our findings. For instance, we did not record the social and family background of the PI-children who participated in this study, while it is possible that variables such as negative family circumstances and life events might have influenced the PI-children's linguistic performance.

Third, we did not explore the causal relationship of the comorbidity of LI and PI. We only considered theories from the field of language acquisition and the acquisition of social-cognitive skills that could predict the observed high comorbidity of LI and PI. Two theories seem best to predict the high comorbidity found here. One the one hand, the Executive Dysfunction Theory (see 2.3.1) that predicts a reciprocal causal comorbid relationship of LI and PI from the start in young LIPI-children. Deficiencies in Motivation, Attention, (auditive) Memory, and Coherence can give a detailed explanation of the emergence of both disorders and the possible negative persisting effects on one another. On the other hand, we see the Functional Theories and Theory-of-Mind theories (see 2.3.3) as having the most explanatory power. These theories predict that LI will cause PI in LI-children, finally becoming LIPI-children over time. Thus, the high comorbidity found here is best predicted by the theoretical assumptions that on the one hand there is a reciprocal causal comorbidity relationship between LI and PI that can exist from the start and on the other a unidirectional causal comorbidity relationship: LI causes PI. Thus, the Executive Dysfunction Theory and Functional Theories, particularly the Theory-of-Mind Theory, are seen by us as the most favourite theories. These theories best explain the comorbidity issue.

Although this was not a main issue here, we showed that 48% of 102 PI-children were judged as being language impaired by their parents before referral to the psychiatric clinic (see 15.2.1). This suggests that in approximately half of the PI-children the LI might indeed have caused the PI. On the other hand, in the detailed description of the LI-characteristics, it was frequently mentioned that some
of the LI-symptoms might be based on underlying deficiencies in executive functioning. For instance, the PI-children where observed to have a relative limited attention-span. Unlike N-children, the PI-children leave the highpoint of the story unexpressed relatively more frequently (see 14.1 and 14.3.6) and show in both genres problems in expressing subordinate clauses that cost a relatively large amount of linguistic memory space (Leonard, 1998; see 8.4 and 9.6).

The causality issue might thus be resolved by assuming that it is just these two comorbidity relationships between LI and PI that most frequently exist in many LIPI-children. In very recent research both relationships are confirmed to exist on the basis of follow-up studies. These studies show that many (delinquent) (pre)adolescent PI-children had early LI (before age six) which has caused the later PI (beyond age six) or have a persistent LI over time that consolidates the PI and vice versa. It was also confirmed by empirical data that many LI and PI-characteristics are based on executive dysfunctioning. The LI and PI symptoms then have a mutual influence on one another as a result of multiple interconnected causal processes over time (Prizant et al., 1989; Cohen et al., 1998a; Prizant, 1999; Teichner et al., 2000; Beitchman et al., 2001).

It is also important to consider in how far the conversational and narrative difficulties in the PI-children described here are stable across different settings and contexts, and in how far they may have been influenced by variables such as unfamiliarity of the interviewer/investigator (Bishop, Hartly and Weir, 1994).

We have the impression that the LI in PI-children might very well manifest itself in clinical circumstances, i.e. psychiatric assessment and treatment with a relatively unfamiliar clinician. It is important to realize that LI might negatively influence PI-treatment, whereas LI-treatment might positively influence PI-symptoms, buffering their effects (Prizant et al., 1990).

Next, the LI might also be even more prominent at school and at home, where the LIPI-children are in a more competitive position with school-friends or siblings. This might result in LIPI-children frequently experiencing verbal communicative breakdowns that, in turn, might consolidate the PI.

Despite these methodological limitations, the micro-level analysis in the areas of both MS and SP in conversation and narrative gives a huge amount of detailed information about language developmental patterns and the deviances found in specific populations of PI-children. The results here have shown a strong comorbid relationship of LI in PI-children. The MS and SP impairment is also strongly linked in this group. Another reason for carrying out the factor analysis is that by reducing the amount of microanalysis, large-scale studies become more feasible. By doing such intensive study based on spontaneous language analysis in combination with the factor analysis, we can now identify LI-symptoms in PI-children that will be worth focussing on in larger scale studies of PI-children in the future. In order to reduce the time investment of LI assessment procedures, we need to find psycho-linguistic markers that show high levels of sensitivity, specificity and accuracy in identifying LI (e.g. Conti-Ramsden and Botting, 2001). For instance, having found
that a large subgroup of PI-children show disabilities in telling a narrative comparably to the disabilities in conversation, we could conduct future studies and focus just on the morphological/syntactic and semantic/pragmatic analysis of the narrative plot as a marker for LI, resulting in a narrative test. This analysis could then be sufficient to detect in a relatively short time whether school-aged PI-children must be diagnosed as MS and SP LI in different diagnostic groups.

By exploring the relationship between LI and PI by using a factor analysis, it became clear that in one-third of all PI-children some extreme MS and SP (dis)abilities are inextricably linked. However, in most of the remaining two-third of all PI-children less severe MS and SP LI exists. Knowing this, we can address the question of whether there are continuities between morphological/syntactic and semantic/pragmatic LI on the one hand and PI on the other hand. To answer this question, we need to put our study in the scientific context of psycholinguistics and psychiatry (see Chapter 2).

Within psychiatry, the identification and definition of specific diagnostic groups of PI-children is still a hot issue (Koelewijn and De Koning, 2003). The comorbidity of PI-symptoms in, for instance, PI-children with PDD-NOS, ADHD and Autistic Spectrum Disorders (ASD) makes it difficult in practice to identify PI-children as belonging to one or the other group. In our opinion this could be related to the LI-symptoms that are used to diagnose these three groups. This makes differential diagnosis problematic. What is needed is a revised diagnostic classification system (DSM-V) that clearly separates LI from PI-symptoms. The possible existence of LI in PI-children should also always be tested by experts in the field of language pathology.

Likewise, within psycholinguistics, the identification and definition of specific diagnostic groups of LI-children also remains an important issue. Many LI-labels have been proposed that cover a specific combination of LI-symptoms related to certain more or less specific diagnostic groups of PI-children (see 1.2; Table 1.1). As explained earlier in 1.2, it has been claimed that many LI-children suffer almost exclusively from morphological/syntactic disorders. These are N-children with no psychiatric impairment or other physical impairments (PH-children) other than language impairment. This diagnostic group traditionally is called Specific Language Impaired (e.g. Stark and Tallal, 1981). Some researchers claim that such a group of N-children with exclusive Grammatical SLI exists, whereas all other impairments do not (e.g. Van der Lely, 2002; Van der Lely and Froud, 2002). SLI-theories frequently only address grammatical impairment either explicitly or implicitly (e.g. De Jong, 1999:17). Others showed that in these children who suffer only from LI, there might exists a subgroup with predominantly semantic/pragmatic disorders, called Pragmatical SLI (P-SLI) (e.g. Bishop, 2000). SLI is a diagnosis largely based on exclusion (Bishop, 1998). Therefore, it must be thoroughly explored whether problems in morphology and syntax exist alongside semantics and pragmatics. It has to be tested whether the (G)-SLI-children have comorbid internalizing/externalizing PI, since it is known that LI and PI are highly
comorbid. For example, in Dutch SLI-children it was excluded that they also suffered from comorbid ADHD, PDD-NOS and Autistic Disorder (e.g. De Jong, 1999).

When we compare the morphosyntactic LI-characteristics of Dutch-speaking PI-children with Dutch-speaking SLI-children (De Jong, 1999), the SLI-children seem to have relatively more difficulties in inflectional morphology. Both groups of children, SLI and the 120 PI-children, seem to resemble each other in problems with the realization of functional (e.g. tense and agreement) and lexical categories (e.g. argument structure) and an overall low language complexity. Because of the profound difficulties with inflectional morphology in SLI-children, this group shows an even more severe LI than those out of the 120 PI-children.

When one assumes that too many ungrammatical sentences always cause violations of the Maxim of Quality and imply a semantic/pragmatic LI, one can question whether a clear subgroup of PI-children and SLI-children with exclusively morphological/syntactic LI can exist. This needs to be the focus of careful future research.

As pointed out earlier, there may exist a continuum of LI-children with semantic/pragmatic disorders on the one hand and PI-children on the autistic spectrum with similar communication problems on the other hand (Wing, 1988; Rapin and Allen, 1987; Bishop, 1989; Bishop and Rosenbloom, 1987; Bishop, 2002; Van Berckelaer-Onnes, 2002), such as PI-children with Asperger's Syndrome (e.g. Smith and Leinonen, 1992) and PI-children with ADHD (Vallance, Im and Cohen, 1999; Van der Meulen, 2003). In general, on end of this continuum there are LI-children plus additional PI with predominantly semantic-pragmatic limitations that affect their social-cognitive functioning in such a negative way that they can be classified as having a PI. On the other end of this continuum there are PI-children with additional LI in which the limited use of language is a reflection of general withdrawal from interpersonal contact or difficulties in having social-cognitive contact with others (see Bloom and Lahey, 1978:598).

When we compare the semantic/pragmatic LI-characteristics of Dutch-speaking PI-children with semantic/pragmatic LI-children (Bishop et al., 2000), there are many similarities. All these LI-children seem to have difficulties in turn taking, topic management, linking sentences cohesively and coherently. However, most of these SP symptoms are related to the area of MS. Our results are in line with the most recent reports of Cohen and colleagues (2000) who excluded PI-children on the autistic spectrum, and also found both types of MS and SP LI exist in PI-children with different types of internalizing and externalizing psychiatric impairment.

In the future more studies are needed that explicitly compare different diagnostic groups of LI-, PI- and LIPI-children, using standard diagnostic criteria for both morphological/syntactic and semantic/pragmatic LI-symptoms and using standard diagnostic criteria for specific internalizing and externalizing PI-symptoms. The labelling of specific PI-types for which an LI diagnosis is a necessary condition, such as for PI-children with ASD or ADHD (see 1.3), must include a fine-grained
specification of LI-symptoms in both language areas. The labelling of these specific PI-types must therefore no longer be solely based on clinical judgement of the LI nor on a parents/teachers’ checklist nor on the results of language tests. On the basis of our results, we argue that detailed language testing must incorporate spontaneous language analysis carried out by language disorder experts and must include the analysis of both morphological/syntactic and semantic/pragmatic (dis)abilities.

We need to develop the same standard diagnostic criteria for the classification of LI-children, PI-children, and LIPI-children on the basis of more fine-grained characteristics in which symptoms in the area of morphology/syntax and semantics/pragmatics on the one hand and social-cognition on the other are separated as far as possible.

We have shown how severe and widespread the language difficulties of children with psychiatric difficulties are. This fact needs to become well-known to all researchers and clinicians working with these children so that the children can be properly diagnosed, treated and supervised in their double handicap.
Appendices to Chapter 3

Appendix 3a Parental Checklist (Blankenstijn and Scheper, 1993)

Vragenlijst spraak-taalontwikkeling

Hieronder vindt u een aantal vragen over de ontwikkeling van spraaktaalvaardigheden van uw kind.

Wij verzoeken u vriendelijk om de vragen eerst rustig door te lezen en daarna de vragen zo volledig mogelijk in te vullen.

Is een bepaalde vraag niet van toepassing op de ontwikkeling van uw kind, zet dan een streepje of schrijf: nvt (niet van toepassing).

Is een bepaalde vraag wel van toepassing op de ontwikkeling van uw kind, zet dan een kruisje (X) in het daarvoor bestemde hokje en geef eventueel nog een schriftelijke aanvulling op de daarvoor bestemde plaats.

Wilt u eerst de persoonlijke gegevens onderaan deze bladzijde invullen, voordat u met het invullen van de vragenlijst begint.

Persoonlijke gegevens:

| Naam kind: | .......................................................... |
| Geboortedatum kind: | .......................................................... |
| Woonplaats: | .......................................................... |
| Datum: | .......................................................... |
| Ingevuld door: | .......................................................... |
Vragen over de spraak-taalontwikkeling

1 Begon uw kind snel, normaal of langzaam met brabbelen? (bijvoorbeeld 'tatatatata' of 'mememema')

[] snel
[] normaal
[] langzaam

2 Op welke leeftijd begon uw kind iets duidelijk te maken door middel van de eerste woorden?

[] rond eerste verjaardag
[] rond anderhalf jaar
[] rond tweede verjaardag
[] later

3 Op welke leeftijd begon uw kind iets duidelijk te maken door middel van korte zinnetjes van twee woorden? (zoals 'poes weg'; 'poes hier'; 'poes lief')

[] rond anderhalf jaar
[] rond tweede verjaardag
[] rond twee-en-een-half jaar
[] later

4 Hoe praat uw kind op dit moment?

[] mijn kind trekt mij vooral mee zonder te brabbelen/geluiden te maken
[] mijn kind maakt vooral gebaren zoals wijzen, knikken, schudden.
[] mijn kind maakt vooral zinnetjes van één woord ('poes'; 'bal')
[] mijn kind maakt vooral zinnetjes van twee woorden ('daar poes'; 'kijk papa')
[] mijn kind maakt zinnen van drie of meer woorden ('daar komt poes'; 'baby is niet lief'; 'ik heb een nieuw liedje geleerd op school')
[] mijn kind praat over gebeurtenissen, die gedurende de dag zijn gebeurd
[] mijn kind praat over gebeurtenissen, die de vorige dag of de vorige week zijn gebeurd
[] mijn kind jengelt en huilt veel
[] mijn kind is opvallend stil
5 Zijn er spraak- en/of taalproblemen geweest bij uw kind:

- nee
- ja

Zo ja wanneer merkte u deze problemen voor het eerst?

Mijn kind was toen ................. jaar.

Kunt u omschrijven welke problemen dit waren:

...........................................................................................................................................
...........................................................................................................................................
...........................................................................................................................................

6 Maakt uw kind contact met u door middel van het gebruiken van taal?

- mijn kind begint uit zichzelf te spreken
- mijn kind antwoordt pas na een vraag of een aansporing
- mijn kind maakt geen contact door middel van taal, maar op een andere manier, namelijk door:

...........................................................................................................................................

7 Maakt uw kind contact met kinderen door middel van het gebruik van taal?

- mijn kind begint uit zichzelf te spreken
- mijn kind antwoordt pas na een vraag of een aansporing
- mijn kind maakt geen contact door middel van taal, maar op een andere manier, namelijk door:

...........................................................................................................................................

8 Is er een periode in het verleden geweest, dat uw kind langdurig onduidelijk sprak, zodat u uw kind moeilijk kon verstaan?

- nee
- ja, namelijk in de periode(n): ............................................................... ..

Zo ja, wat was de reden hiervan? *

- mijn kind had moeite met het uitspreken van bepaalde klanken
- mijn kind slikte delen van woorden in
mijn kind sprak binnensmonds
mijn kind sprak te snel
mijn kind sprak onduidelijk om een andere reden, namelijk:

9 Spreekt uw kind onduidelijk op dit moment?

[] nee
[] ja

Zo ja, wat is hiervan de reden? *

[] mijn kind heeft moeite met het uitspreken van bepaalde klanken
[] mijn kind slikt delen van woorden in
[] mijn kind spreekt binnensmonds
[] mijn kind spreekt te snel
[] mijn kind spreekt onduidelijk om een andere reden, namelijk:

10 Is er een tijd geweest, dat uw kind vaak moeilijk te begrijpen was?

[] nee
[] ja, in de periode(n): .................................................................

Zo ja, was dat als uw kind: *

[] een vraag aan u stelde
[] een antwoord gaf
[] iets tegen u zei
[] een gesprek met u voerde
[] over een gebeurtenis vertelde

11 Is uw kind vaak moeilijk te begrijpen op dit moment?

[] nee
[] ja

Zo ja, is dat als uw kind: *

[] een vraag aan u stelt
12 Begrijpt uw kind bijvoorbeeld een kort opdrachtje, zoals 'doe je jas maar aan!'?

[] nee
[] ja

Einde van de vragenlijst
Appendix 3b  Pictures of the Frog story 'Frog, where are you?'

1 Pictures reproduced from Mayer (1969), with permission of the author/artist and publisher. Original format: 25 cm x 14.5 cm, sepia-tone, one single panel per one-half double panel per page, no text, page numbers added.
Appendices

Appendix 3c  Spontaneous Language Analysis Procedure (STAP)
Description of the STAP developed by Van den Dungen and Verbeek (1994). Dutch norms exist for every year-group between the ages of 4;0 and 7;11 giving the mean-score and the different z-scores with respect to the following variables.

Morphosyntax:

A. Grammaticality:

2 general measures:
1. number of ungrammatical T-units
2. total of grammatical errors

8 specific variables:
3. omission lexical verb
4. agreement error
5. past tense error
6. perfect tense error
7. omission noun
8. omission determiner
9. determiner error
10. word order error

B. Complexity:

2 general variables:
1. words per T-unit (MLU)
2. average length of 5 longest T-units (MLUL)

13 specific variables:
3. coordination
4. subordination
5. finite verb
6. verbal construction
7. past tense correct
8. perfect tense correct
9. number of nouns
10. number of adjectives
11. third person pronouns
12. adverbial expressions of place
13. adverbial expressions of time
14. other adverbial expressions
15. total number of adverbial expressions

Semantics

2 variables of incorrectness:
1. semantically marked utterance: moderate
2. semantically marked utterance: severe

Pragmatics

3 variables of incorrectness:
1. implicit reference
2. pragmatically marked utterance: moderate
3. pragmatically marked utterance: severe
Appendix 3d  Flow-chart
Translated short version of the Flow-chart used to code incoherent communicative contributions (Blankenstijn, 2003; based on Roelofs, 1998:202-204)

1. Is the communicative contribution marked on the morphological/syntactic level?
   no → go to question 2.
   yes → make a morphological/syntactic paraphrasis and code the morphological/syntactic error(s) and go to question 2.

2. Is the communicative contribution marked on the semantic level?
   no → go to question 3.
   yes → make a semantic paraphrasis and code the semantic errors and go to question 3.

3. Is the communicative contribution on the pragmatic level incohesively linked?
   no → go to question 4.
   yes → make a paraphrasis in order to re-establish cohesion with respect to connectives, clausal ellipsis and co-referential cohesion and code inappropriate connectives, ellipsis and reference assignment error(s) and go to question 4.

4. Is the communicative contribution of the child on the pragmatic level incoherently linked with the preceding one?
   no → go to question 5.
   yes → make a paraphrasis in such a way that the connection becomes unmarked and code unmarked topic shift or ignoring initiation and go to question 5.

5. Is the connection between the communicative contribution of the second pairpart with that of the first pairpart incoherent with respect to its content, intention or because the 'yes' or 'no' answer is left implicit?
   no → go to question 6.
   yes → make a paraphrasis in such a way that the connection becomes unmarked and code different content, different intention or yes/no implication and go to question 6.

6. Is the communicative contribution incoherent because of missing information within the communicative contribution or within the turn?
   no → go to question 7.
   yes → make a paraphrasis by adding the necessary information, code jump or gap and go to question 7.

7. Is the communicative contribution incoherent because of redundant information?
   no → go to question 8.
   yes → make a paraphrasis: delete the redundant information, code repetition, reiteration or elaboration and go to question 8.

8. Is the communicative contribution still incoherent because of ambiguous information?
   no → the analysis is finished.
   yes → make a paraphrasis and code ambiguous information. The analysis is finished.
### Appendix 3c  The interrater-reliability scores

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measure</th>
<th>Result</th>
<th>Language data</th>
<th>Reviewers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segmentation</td>
<td>Percentages</td>
<td>88%</td>
<td>7% N-children</td>
<td>3</td>
</tr>
<tr>
<td>MLU</td>
<td></td>
<td>.98</td>
<td>7% N-children</td>
<td>3</td>
</tr>
<tr>
<td>Pause</td>
<td></td>
<td>.89</td>
<td>7% N-children</td>
<td>3</td>
</tr>
<tr>
<td>Pause length</td>
<td></td>
<td>.91</td>
<td>4% Pl- and 7% N-children</td>
<td>3</td>
</tr>
<tr>
<td>Speech overlap</td>
<td></td>
<td>.95</td>
<td>4% Pl- and 7% N-children</td>
<td>3</td>
</tr>
<tr>
<td>Grammaticity C</td>
<td></td>
<td>.98</td>
<td>9% N- and 4% Pl-children</td>
<td>7</td>
</tr>
<tr>
<td>Complexity C</td>
<td></td>
<td>.83</td>
<td>9% N-children</td>
<td>2</td>
</tr>
<tr>
<td>Argument structure C</td>
<td>Percentages</td>
<td>99%</td>
<td>9% N-children</td>
<td>7</td>
</tr>
<tr>
<td>Argument struct. N</td>
<td>Percentages</td>
<td>99%</td>
<td>11% Pl-children</td>
<td>7</td>
</tr>
<tr>
<td>- overt/drop</td>
<td></td>
<td>.96</td>
<td>11% Pl-children</td>
<td>2</td>
</tr>
<tr>
<td>Lexical Verb C</td>
<td></td>
<td>.94</td>
<td>11% Pl-children</td>
<td>2</td>
</tr>
<tr>
<td>Lexical Verb N</td>
<td>Percentages</td>
<td>99%</td>
<td>9% N-children</td>
<td>2</td>
</tr>
<tr>
<td>- obligatory object</td>
<td></td>
<td>.94</td>
<td>11% Pl-children</td>
<td>7</td>
</tr>
<tr>
<td>- optional object</td>
<td></td>
<td>.94</td>
<td>11% Pl-children</td>
<td>2</td>
</tr>
<tr>
<td>- intransitive</td>
<td></td>
<td>.86</td>
<td>11% Pl-children</td>
<td>2</td>
</tr>
<tr>
<td>- no lexical verb</td>
<td></td>
<td>.95</td>
<td>11% Pl-children</td>
<td>2</td>
</tr>
<tr>
<td>Agreement N</td>
<td></td>
<td>.93</td>
<td>11% Pl-children</td>
<td>2</td>
</tr>
<tr>
<td>Tense marking N</td>
<td></td>
<td>.99</td>
<td>11% Pl-children</td>
<td>2</td>
</tr>
<tr>
<td>Turn</td>
<td></td>
<td>.98</td>
<td>5% N- and 4% Pl-children</td>
<td>2</td>
</tr>
<tr>
<td>Adjacency pairs</td>
<td></td>
<td>.90</td>
<td>5% N- and 4% Pl-children</td>
<td>2</td>
</tr>
<tr>
<td>Speech acts</td>
<td></td>
<td>.90</td>
<td>3% N- and 4% Pl-children</td>
<td>2</td>
</tr>
<tr>
<td>Form of Speech act</td>
<td></td>
<td>.93</td>
<td>3% N- and 4% Pl-children</td>
<td>2</td>
</tr>
<tr>
<td>Topic</td>
<td></td>
<td>.88</td>
<td>4% N- and 3% Pl-children</td>
<td>2</td>
</tr>
<tr>
<td>Cohesion</td>
<td></td>
<td>.87</td>
<td>4% N-children</td>
<td>2</td>
</tr>
<tr>
<td>Coherence</td>
<td></td>
<td>.86</td>
<td>4% N-children</td>
<td>2</td>
</tr>
<tr>
<td>Plot analysis</td>
<td></td>
<td>.91</td>
<td>5% N-children</td>
<td>2</td>
</tr>
</tbody>
</table>
Appendices to Chapter 4

Appendix 4a  Transcription and segmentation conventions according to CHAT (MacWhinney, 1995)

# = relative short pause within a T-unit
## = relative long pause within a T-unit
#1 = turn exchange gap between 1 and 2 seconds
#2 = turn exchange gap between 2 and 3 seconds

xx = unintelligible word or syllable
xxx = unintelligible language unit more than a word or syllable
www = untranscribed material

+... = incompletion marker for incomplete but not interrupted T-unit
+, = self-completion of a T-unit
++ = other-completion of a T-unit
+" = direct voice

[?] = residual uncertainty about 'best guess'

<> = marker of mazes
<> [>] = simultaneous speech: the overlap follows indicates that the text enclosed in angle brackets is being said at the same time as the following speaker's bracketed speech
<> [<] = simultaneous speech: the overlap precedes indicates that the text enclosed in angle brackets is being said at the same time as the preceding speaker's bracketed speech

Ø = unexpressed linguistic unit

%gpx : gestures and proxemic material
%com : comment
%par : paralinguistic behaviours, such as coughing, laughing
%act : actions
**Appendices**

**Appendix 4b**  Mean total number, percentage (related to 50 T-units) and standard deviations of ungrammatical T-units in N-children (STAP) and PI-children in the conversational genre.

<table>
<thead>
<tr>
<th>Ungrammatical T-units</th>
<th>N-children n=240</th>
<th></th>
<th></th>
<th></th>
<th>PI-children n=120</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
<td>sd</td>
<td></td>
<td>x</td>
<td>%</td>
<td>sd</td>
<td></td>
</tr>
<tr>
<td>4yrs</td>
<td>10.00</td>
<td>20%</td>
<td>-</td>
<td></td>
<td>21.90</td>
<td>44%</td>
<td>7.09</td>
<td></td>
</tr>
<tr>
<td>5yrs</td>
<td>9.00</td>
<td>18%</td>
<td>-</td>
<td></td>
<td>15.95</td>
<td>32%</td>
<td>4.25</td>
<td></td>
</tr>
<tr>
<td>6yrs</td>
<td>8.00</td>
<td>16%</td>
<td>-</td>
<td></td>
<td>18.25</td>
<td>37%</td>
<td>7.87</td>
<td></td>
</tr>
<tr>
<td>7yrs</td>
<td>7.00</td>
<td>14%</td>
<td>-</td>
<td></td>
<td>14.95</td>
<td>30%</td>
<td>3.59</td>
<td></td>
</tr>
<tr>
<td>8yrs</td>
<td>7.00*</td>
<td>14%</td>
<td>-</td>
<td></td>
<td>16.10</td>
<td>32%</td>
<td>5.22</td>
<td></td>
</tr>
<tr>
<td>9yrs</td>
<td>7.00*</td>
<td>14%</td>
<td>-</td>
<td></td>
<td>13.85</td>
<td>28%</td>
<td>3.73</td>
<td></td>
</tr>
<tr>
<td>Total mean</td>
<td>8.00</td>
<td>16%</td>
<td>-</td>
<td></td>
<td>16.83</td>
<td>34%</td>
<td>6.03</td>
<td></td>
</tr>
</tbody>
</table>

* The mean value of the eight and nine-year-old N-children is assessed by extrapolation.

**Appendix 4c**  Mean total number, percentage (related to 50 T-units) and standard deviations of grammatical errors per age group in N-children (STAP) and PI-children in the conversational genre.

<table>
<thead>
<tr>
<th>Grammatical errors</th>
<th>N-children n=240</th>
<th></th>
<th></th>
<th></th>
<th>PI-children n=120</th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
<td>sd</td>
<td></td>
<td>x</td>
<td>%</td>
<td>sd</td>
<td></td>
</tr>
<tr>
<td>4yrs</td>
<td>12.00</td>
<td>24%</td>
<td>-</td>
<td></td>
<td>39.90</td>
<td>80%</td>
<td>20.22</td>
<td></td>
</tr>
<tr>
<td>5yrs</td>
<td>11.00</td>
<td>22%</td>
<td>-</td>
<td></td>
<td>27.90</td>
<td>56%</td>
<td>9.22</td>
<td></td>
</tr>
<tr>
<td>6yrs</td>
<td>10.00</td>
<td>20%</td>
<td>-</td>
<td></td>
<td>32.80</td>
<td>66%</td>
<td>16.45</td>
<td></td>
</tr>
<tr>
<td>7yrs</td>
<td>9.00</td>
<td>18%</td>
<td>-</td>
<td></td>
<td>23.75</td>
<td>48%</td>
<td>7.17</td>
<td></td>
</tr>
<tr>
<td>8yrs</td>
<td>9.00*</td>
<td>18%</td>
<td>-</td>
<td></td>
<td>25.40</td>
<td>51%</td>
<td>10.01</td>
<td></td>
</tr>
<tr>
<td>9yrs</td>
<td>9.00*</td>
<td>18%</td>
<td>-</td>
<td></td>
<td>21.80</td>
<td>44%</td>
<td>6.57</td>
<td></td>
</tr>
<tr>
<td>Total mean</td>
<td>10.00</td>
<td>20%</td>
<td>-</td>
<td></td>
<td>28.59</td>
<td>57%</td>
<td>13.82</td>
<td></td>
</tr>
</tbody>
</table>

* The mean value of the eight and nine-year-old N-children is assessed by extrapolation.
### Appendix 4d

Distribution of total number and percentage of *N*-children from the Roelofs-population (Roelofs, 1998) per age group (n=15) and total number and percentage of *N*-children in the total Roelofs-population (n=45) according to *z*-scores *sd* ≤ -2, -2 < *sd* ≤ -1 and *sd* > -1 on the variables total number of ungrammatical *T*-units and grammatical errors in a semi-structured interview.

<table>
<thead>
<tr>
<th>N-children</th>
<th>Ungrammatical <em>T</em>-units</th>
<th>Grammatical errors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>sd ≤ -2</td>
<td>-2 &lt; sd ≤ -1</td>
</tr>
<tr>
<td>Normal</td>
<td>2.3%</td>
<td>16%</td>
</tr>
<tr>
<td></td>
<td>2.3%</td>
<td>16%</td>
</tr>
<tr>
<td></td>
<td>2.3%</td>
<td>16%</td>
</tr>
<tr>
<td>4yrs</td>
<td>2 13% 4 27%</td>
<td>9 60%</td>
</tr>
<tr>
<td>6yrs</td>
<td>7% 0% 14 93%</td>
<td>2 13%</td>
</tr>
<tr>
<td>8yrs</td>
<td>7% 4 27% 10 67%</td>
<td>2 13%</td>
</tr>
<tr>
<td>Total</td>
<td>4 9% 8 18% 33 73%</td>
<td>8 18%</td>
</tr>
</tbody>
</table>

### Appendix 4e

Mean total number and percentage ungrammatical *T*-units and mean total number and percentage grammatical errors in *N*-children from the Roelofs-population (Roelofs, 1998).

<table>
<thead>
<tr>
<th>N-children</th>
<th>Ungrammatical <em>T</em>-units</th>
<th>Grammatical errors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>x</em> <em>%</em> <em>sd</em></td>
<td><em>x</em> <em>%</em> <em>sd</em></td>
</tr>
<tr>
<td>4 yrs</td>
<td>13.87 28% 5.74</td>
<td>19.80 40% 9.75</td>
</tr>
<tr>
<td>6 yrs</td>
<td>9.93 20% 3.10</td>
<td>13.87 28% 5.37</td>
</tr>
<tr>
<td>8 yrs</td>
<td>8.67 17% 4.22</td>
<td>12.27 25% 6.49</td>
</tr>
<tr>
<td>Total mean</td>
<td>10.82 22% 4.92</td>
<td>15.31 31% 7.97</td>
</tr>
</tbody>
</table>

Ungrammatical *T*-units: F (1,42) = 10.068;Eta squared = .21; R squared = .20
Grammatical errors: F (1,42) = 7.695; Eta squared = .17; R squared = .15
Appendices to Chapter 5

**Appendix 5a**  Mean total number, percentage (related to all T-units with a finite verb) and standard deviation missing subjects (grammatical and ungrammatical forms) in 45 N-children and 120 PI-children

<table>
<thead>
<tr>
<th>Missing subjects</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>4 yrs</td>
<td>1.80</td>
<td>4%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.53</td>
<td>1%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.60</td>
<td>1%</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.98</td>
<td>2%</td>
</tr>
</tbody>
</table>

**Appendix 5b**  Mean total number, percentage (related to all missing subjects) and standard deviation topicalized missing subjects in 45 N-children and 120 PI-children

<table>
<thead>
<tr>
<th>Topicalized missing subjects</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>Place condition fulfilled:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>1.53</td>
<td>85%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.47</td>
<td>89%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.60</td>
<td>100%</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.87</td>
<td>89%</td>
</tr>
</tbody>
</table>
Appendix 5c  Mean total number, percentage (related to 50 T-units) and standard deviation obligatorily object verbs and mean total number, percentage (related to mean total number of obligatorily object verbs) and standard deviation missing objects (grammatical and ungrammatical forms) in 45 N-children and 120 PI-children.

<table>
<thead>
<tr>
<th>Missing objects</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td><strong>Obligatorily object verbs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>20.47</td>
<td>41%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6 yrs</td>
<td>21.35</td>
<td>43%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8 yrs</td>
<td>20.87</td>
<td>42%</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total mean</strong></td>
<td>20.96</td>
<td>42%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Missing objects</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td><strong>Place condition fulfilled:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>3.33</td>
<td>16%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6 yrs</td>
<td>1.13</td>
<td>5%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.93</td>
<td>4%</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total mean</strong></td>
<td>1.80</td>
<td>9%</td>
</tr>
</tbody>
</table>

Appendix 5d  Mean total number, percentage (related to all missing objects) and standard deviation topicalized missing objects in 45 N-children and 120 PI-children.

<table>
<thead>
<tr>
<th>Topicalized missing objects</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td><strong>Place condition fulfilled:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>2.27</td>
<td>68%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.80</td>
<td>71%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.53</td>
<td>57%</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total mean</strong></td>
<td>1.20</td>
<td>66%</td>
</tr>
</tbody>
</table>
### Appendices to Chapter 6

**Appendix 6a** Pearson correlation coefficient and significance level of percentage of adversial errors of place, time and other (related to the total number of adverbial errors in 50 T-units) in 45 N-children and 60 PI-children

<table>
<thead>
<tr>
<th>Pearson correlation coefficient</th>
<th>N-children n=45</th>
<th>PI-children n=60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adverbial errors of place, time and other</td>
<td>value</td>
<td>sign.</td>
</tr>
<tr>
<td>4yrs P-T</td>
<td>0.070</td>
<td>0.402</td>
</tr>
<tr>
<td>4yrs P-O</td>
<td>0.109</td>
<td>0.350</td>
</tr>
<tr>
<td>4yrs T-O</td>
<td>-0.378</td>
<td>0.082</td>
</tr>
<tr>
<td>6yrs P-T</td>
<td>-0.092</td>
<td>0.372</td>
</tr>
<tr>
<td>6yrs P-O</td>
<td>-0.186</td>
<td>0.253</td>
</tr>
<tr>
<td>6yrs T-O</td>
<td>-0.112</td>
<td>0.346</td>
</tr>
<tr>
<td>8yrs P-T</td>
<td>-0.262</td>
<td>0.173</td>
</tr>
<tr>
<td>8yrs P-O</td>
<td>0.275</td>
<td>0.161</td>
</tr>
<tr>
<td>8yrs T-O</td>
<td>-0.340</td>
<td>0.108</td>
</tr>
<tr>
<td>Total mean P-T</td>
<td>-0.108</td>
<td>0.241</td>
</tr>
<tr>
<td>Total mean P-O</td>
<td>0.075</td>
<td>0.311</td>
</tr>
<tr>
<td>Total mean T-O</td>
<td>-0.238*</td>
<td>0.030</td>
</tr>
</tbody>
</table>

* Correlation is significant at the .05 level (1-tailed).
Appendices to Chapter 8

Appendix 8a  
Mean total number, percentage (related to 50 T-units) and standard deviations of MLU in words in 240 N-children (STAP) and 120 PI-children in the conversational genre

<table>
<thead>
<tr>
<th>MLU in words</th>
<th>N-children n=240</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>sd</td>
</tr>
<tr>
<td>4yrs</td>
<td>6.00</td>
<td>-</td>
</tr>
<tr>
<td>5yrs</td>
<td>6.00</td>
<td>-</td>
</tr>
<tr>
<td>6yrs</td>
<td>7.00</td>
<td>-</td>
</tr>
<tr>
<td>7yrs</td>
<td>7.00</td>
<td>-</td>
</tr>
<tr>
<td>8yrs</td>
<td>7.00*</td>
<td>-</td>
</tr>
<tr>
<td>9yrs</td>
<td>7.00*</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>6.67</td>
<td>-</td>
</tr>
</tbody>
</table>

* The mean value of the eight and nine-year-old N-children is assessed by extrapolation.

Appendix 8b  
Mean total number, percentage (related to 50 T-units) and standard deviations of words in 5 longest T-units (MLUL) in 240 N-children (STAP) and 120 PI-children in the conversational genre

<table>
<thead>
<tr>
<th>MLUL Words in 5 longest T-units</th>
<th>N-children n=240</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>sd</td>
</tr>
<tr>
<td>4yrs</td>
<td>11.00</td>
<td>-</td>
</tr>
<tr>
<td>5yrs</td>
<td>12.00</td>
<td>-</td>
</tr>
<tr>
<td>6yrs</td>
<td>13.00</td>
<td>-</td>
</tr>
<tr>
<td>7yrs</td>
<td>14.00</td>
<td>-</td>
</tr>
<tr>
<td>8yrs</td>
<td>14.00*</td>
<td>-</td>
</tr>
<tr>
<td>9yrs</td>
<td>14.00*</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>13.00</td>
<td>-</td>
</tr>
</tbody>
</table>

* The mean value of the eight and nine-year-old N-children is assessed by extrapolation.
Appendices 477

Appendix 8c Mean total number, percentage (related to 50 T-units) and standard deviations of embedded clauses in 240 N-children (STAP) and 120 PI-children in the conversational genre

<table>
<thead>
<tr>
<th>Embedded clauses</th>
<th>N-children n=240</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>sd</td>
</tr>
<tr>
<td>4yrs</td>
<td>3.40</td>
<td>-</td>
</tr>
<tr>
<td>5yrs</td>
<td>3.20</td>
<td>-</td>
</tr>
<tr>
<td>6yrs</td>
<td>4.40</td>
<td>-</td>
</tr>
<tr>
<td>7yrs</td>
<td>4.40</td>
<td>-</td>
</tr>
<tr>
<td>8yrs</td>
<td>4.40*</td>
<td>-</td>
</tr>
<tr>
<td>9yrs</td>
<td>4.40*</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>4.03</td>
<td>-</td>
</tr>
</tbody>
</table>

* The mean value of the eight and nine-year-old N-children is assessed by extrapolation.

Appendix 8d Mean total number, percentage (related to T-units with a realized verb) and standard deviations of obligatory transitive verbs in 45 N-children and 120 PI-children in the conversational genre

<table>
<thead>
<tr>
<th>Obligatory transitive verbs</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>T-units used in analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total mean</td>
<td>48.65</td>
<td>-</td>
</tr>
<tr>
<td>Obligatory transitive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>verbs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4yrs</td>
<td>20.53</td>
<td>42.2%</td>
</tr>
<tr>
<td>5yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6yrs</td>
<td>21.60</td>
<td>44.4%</td>
</tr>
<tr>
<td>7yrs</td>
<td>20.87</td>
<td>42.9%</td>
</tr>
<tr>
<td>8yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>21.00</td>
<td>43.2%</td>
</tr>
</tbody>
</table>
## Appendix 8e

**Mean total number, percentage (related to T-units with a realized verb) and standard deviations of optional transitive verbs in 45 N-children and 120 PI-children in the conversational genre**

<table>
<thead>
<tr>
<th>Optional transitive verbs</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td><strong>T-units used in analysis</strong></td>
<td>48.65</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total mean</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optional transitive verbs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>verbs</td>
<td>9.87</td>
<td>20.3%</td>
</tr>
<tr>
<td>4yrs</td>
<td>9.87</td>
<td>20.3%</td>
</tr>
<tr>
<td>5yrs</td>
<td>8.47</td>
<td>17.4%</td>
</tr>
<tr>
<td>6yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7yrs</td>
<td>9.40</td>
<td>19.3%</td>
</tr>
<tr>
<td><strong>Total mean</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Appendix 8f

**Mean total number, percentage (related to T-units with a realized verb) and standard deviations of intransitive verbs in 45 N-children and 120 PI-children in the conversational genre**

<table>
<thead>
<tr>
<th>Intransitive verbs</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td><strong>T-units used in analysis</strong></td>
<td>48.65</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total mean</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intransitive verbs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>verbs</td>
<td>8.80</td>
<td>18.1%</td>
</tr>
<tr>
<td>4yrs</td>
<td>9.93</td>
<td>20.4%</td>
</tr>
<tr>
<td>5yrs</td>
<td>10.20</td>
<td>21.0%</td>
</tr>
<tr>
<td>6yrs</td>
<td>9.64</td>
<td>19.8%</td>
</tr>
<tr>
<td><strong>Total mean</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 8g

Mean total number, percentage (related to T-units with a realized verb) and standard deviations of copula verbs in 45 N-children and 120 PI-children in the conversational genre

<table>
<thead>
<tr>
<th>Copula verbs</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>T-units used in analysis</td>
<td>48.65</td>
<td>-</td>
</tr>
<tr>
<td>Copula verbs 4yrs</td>
<td>9.07</td>
<td>18.8%</td>
</tr>
<tr>
<td>5yrs</td>
<td>7.80</td>
<td>16.0%</td>
</tr>
<tr>
<td>6yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7yrs</td>
<td>8.53</td>
<td>17.5%</td>
</tr>
<tr>
<td>8yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9yrs</td>
<td>8.47</td>
<td>17.4%</td>
</tr>
<tr>
<td>Total mean</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Classification list of split verbs used in the analysis (partly according to Krämer's classification list* (1995) and partly according to Scheper's classification list (2003))**

<table>
<thead>
<tr>
<th>Verb</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aandoen*</td>
<td>put on, wear</td>
</tr>
<tr>
<td>Aanhebben*</td>
<td>put on, wear</td>
</tr>
<tr>
<td>Aankleden</td>
<td>put on, put clothes on</td>
</tr>
<tr>
<td>Aanmaken*</td>
<td>put on, turn on</td>
</tr>
<tr>
<td>Aanpakken</td>
<td>take</td>
</tr>
<tr>
<td>Aanraken</td>
<td>touch</td>
</tr>
<tr>
<td>Aansteken*</td>
<td>turn on</td>
</tr>
<tr>
<td>Aanraken*</td>
<td>put on</td>
</tr>
<tr>
<td>Aansteken*</td>
<td>turn on</td>
</tr>
<tr>
<td>Achteraan gaan</td>
<td>go after</td>
</tr>
<tr>
<td>Achteraan gaan*</td>
<td>go after</td>
</tr>
<tr>
<td>Afbreken</td>
<td>breakdown</td>
</tr>
<tr>
<td>Afdoen*</td>
<td>turn off</td>
</tr>
<tr>
<td>Aflaven</td>
<td>push</td>
</tr>
<tr>
<td>Afgooien</td>
<td>throw down</td>
</tr>
<tr>
<td>Afhalen</td>
<td>fetch down</td>
</tr>
<tr>
<td>Afknippen</td>
<td>cut through</td>
</tr>
<tr>
<td>Afmaakken*</td>
<td>make ready</td>
</tr>
<tr>
<td>Afpakken*</td>
<td>take away</td>
</tr>
<tr>
<td>Afplukken*</td>
<td>pick (flowers)</td>
</tr>
<tr>
<td>Afvallen</td>
<td>lost weight</td>
</tr>
<tr>
<td>Afgewogen*</td>
<td>weigh</td>
</tr>
<tr>
<td>Doddschieten*</td>
<td>kill (shoot dead)</td>
</tr>
<tr>
<td>Inlaten</td>
<td>let in</td>
</tr>
<tr>
<td>Innemen</td>
<td>take in</td>
</tr>
<tr>
<td>Klaarmaken*</td>
<td>make ready</td>
</tr>
<tr>
<td>losmaken*</td>
<td>unfasten (make loose)</td>
</tr>
<tr>
<td>Meebrengen*</td>
<td>take along</td>
</tr>
<tr>
<td>Meenemen*</td>
<td>take/grab along</td>
</tr>
<tr>
<td>Neerleggen*</td>
<td>put down</td>
</tr>
<tr>
<td>Neerzetten</td>
<td>put down</td>
</tr>
<tr>
<td>Om draaien*</td>
<td>turn around</td>
</tr>
<tr>
<td>Omruilen*</td>
<td>exchange; swap</td>
</tr>
<tr>
<td>Onderstoppen*</td>
<td>put underneath, tuck in</td>
</tr>
<tr>
<td>Opdoen</td>
<td>pick up</td>
</tr>
<tr>
<td>Opdoen*</td>
<td>open</td>
</tr>
<tr>
<td>Opendoen*</td>
<td>open</td>
</tr>
<tr>
<td>Opzetten*</td>
<td>open</td>
</tr>
<tr>
<td>Opblazen*</td>
<td>blow up</td>
</tr>
<tr>
<td>Opzetten*</td>
<td>open</td>
</tr>
<tr>
<td>Ophebben*</td>
<td>put on</td>
</tr>
<tr>
<td>Ophebben (eten)</td>
<td>finish (to eat)</td>
</tr>
<tr>
<td>Ophebben*</td>
<td>put on, wear</td>
</tr>
<tr>
<td>Ophebben (eten)</td>
<td>finish (to eat)</td>
</tr>
<tr>
<td>Opzetten*</td>
<td>open</td>
</tr>
<tr>
<td>Opzetten*</td>
<td>put on</td>
</tr>
<tr>
<td>Opzetten*</td>
<td>lift</td>
</tr>
<tr>
<td>Oprollen*</td>
<td>roll up</td>
</tr>
<tr>
<td>Opschrijven*</td>
<td>write down</td>
</tr>
<tr>
<td>Opschrijven*</td>
<td>write down</td>
</tr>
<tr>
<td>Opspringen</td>
<td>jump up</td>
</tr>
</tbody>
</table>
Appendices

Optillen  lift up
Op trekken*  pull up
Opvouwen*  fold
Stukmaken*  break
Tegenhouden  stop
Tegenkomen  meet
Terugkrijgen  get back
Tegenvallen  be disappointing
Terugzetten*  put back
Toedoien*  blow out
Uitblazen*  turn off, take off
Uitdrien*  turn off
Uitdrinken*  drinking until cup is empty
Uitgieten*  pouring until container is empty
Uitrollen  fall out
Uittrekken  pull out
Uitvoeren  carry out
Uitzien  look
Uitzetten*  turn off
Uitzoeken  search for
Vasthouden*  hold on to
Vastmaken*  fasten
Wegbergen*  put out of sight
Wegbrengen  put away
Wegdoen*  put away
Weggooien  through away
Weghalen  take away
Wegleggen*  put away
Wegsmijten*  throw away
Wegsteken*  put away
Wegstoppen*  put away
Wegzeiten*  put away
### Appendix 8i  
Mean total number, percentage (related to obligatory object context) and standard deviations of split verbs in 45 N-children and 120 PI-children in the conversational genre

<table>
<thead>
<tr>
<th></th>
<th>N- children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td><strong>T-units used in analysis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total mean</td>
<td>48.65</td>
<td>-</td>
</tr>
<tr>
<td><strong>Split verbs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4yrs</td>
<td>2.40</td>
<td>4.9%</td>
</tr>
<tr>
<td>5yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6yrs</td>
<td>2.53</td>
<td>5.2%</td>
</tr>
<tr>
<td>7yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8yrs</td>
<td>2.80</td>
<td>5.7%</td>
</tr>
<tr>
<td>9yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>2.58</td>
<td>5.2%</td>
</tr>
</tbody>
</table>

### Appendix 8j  
Mean total number, percentage (related to obligatory object context) and standard deviations of light/GAP verbs in 45 N-children and 60 PI-children in the conversational genre

<table>
<thead>
<tr>
<th></th>
<th>N- children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td><strong>Light/GAP verbs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4yrs</td>
<td>0.33</td>
<td>0.7%</td>
</tr>
<tr>
<td>6yrs</td>
<td>1.00</td>
<td>2.1%</td>
</tr>
<tr>
<td>8yrs</td>
<td>0.40</td>
<td>0.8%</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.58</td>
<td>1.2%</td>
</tr>
</tbody>
</table>
Appendices to Chapter 9

Appendix 9a  Mean total number, percentage and standard deviations of narrative T-units and ungrammatical narrative T-units (related to the total number of narrative T-units) in 45 N-children and 120 PI-children in the narrative genre

<table>
<thead>
<tr>
<th>Narrative T-units and Ungrammatical narrative T-units</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>Narrative T-units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4yrs</td>
<td>53.8</td>
<td>-</td>
</tr>
<tr>
<td>5yrs</td>
<td>4.6</td>
<td>-</td>
</tr>
<tr>
<td>6yrs</td>
<td>44.6</td>
<td>-</td>
</tr>
<tr>
<td>7yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8yrs</td>
<td>53.6</td>
<td>-</td>
</tr>
<tr>
<td>9yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>50.6</td>
<td>-</td>
</tr>
</tbody>
</table>

| Ungrammatical Narrative T-units                      |  |   |    |   |   |    |
| 4yrs                                                 | 23.2 | 45.7% | 11.46 | 25.3 | 53.2% | 13.06 |
| 5yrs                                                 | - | - | - | 18.7 | 43.5% | 7.50 |
| 6yrs                                                 | 12.2 | 23.9% | 6.72 | 16.0 | 36.7% | 7.83 |
| 7yrs                                                 | - | - | - | 15.9 | 31.3% | 10.21 |
| 8yrs                                                 | 9.7 | 19.1% | 3.63 | 19.2 | 36.0% | 13.09 |
| 9yrs                                                 | - | - | - | 14.7 | 27.2% | 7.05 |
| Total mean                                           | 15.0 | 29.6% | 9.77 | 20.2 | 38.0% | 12.04 |

Appendix 9b  Mean total number, percentage and standard deviations of grammatical errors (related to the total number of narrative T-units) in 45 N-children and 120 PI-children in the narrative genre

<table>
<thead>
<tr>
<th>Grammatical errors Narrative T-units</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>4yrs</td>
<td>34.5</td>
<td>64.1%</td>
</tr>
<tr>
<td>5yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6yrs</td>
<td>16.2</td>
<td>36.3%</td>
</tr>
<tr>
<td>7yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8yrs</td>
<td>13.9</td>
<td>25.9%</td>
</tr>
<tr>
<td>9yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>21.5</td>
<td>42.4%</td>
</tr>
</tbody>
</table>
**Appendix 9c**  
Mean total number, percentage and standard deviations of *missing lexical verbs* (related to the total number of narrative T-units) in 45 N- and PI-children in the narrative genre

<table>
<thead>
<tr>
<th>Missing lexical verbs</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narrative T-units</td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>4yrs</td>
<td>4.00</td>
<td>7.4%</td>
</tr>
<tr>
<td>5yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6yrs</td>
<td>0.80</td>
<td>1.8%</td>
</tr>
<tr>
<td>7yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8yrs</td>
<td>1.66</td>
<td>3.1%</td>
</tr>
<tr>
<td>9yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total mean</strong></td>
<td>2.16</td>
<td>4.3%</td>
</tr>
</tbody>
</table>

**Appendix 9d**  
Mean total number, percentage (related to the total number of narrative T-units) and standard deviations of *causal subordinate conjunctions* in 45 N- and PI-children in the narrative genre

<table>
<thead>
<tr>
<th>Causal subordinate conjunctions</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narrative</td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>4yrs</td>
<td>0.20</td>
<td>%</td>
</tr>
<tr>
<td>5yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6yrs</td>
<td>0.13</td>
<td>%</td>
</tr>
<tr>
<td>7yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8yrs</td>
<td>0.40</td>
<td>%</td>
</tr>
<tr>
<td>9yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total mean</strong></td>
<td>0.24</td>
<td>%</td>
</tr>
</tbody>
</table>
Mean total number, percentage (related to the total number of narrative T-units) and standard deviations of **Temporal subordinate conjunctions** in 45 N- and PI-children in the narrative genre

<table>
<thead>
<tr>
<th>Temporal subordinate conjunctions</th>
<th>Narrative</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
<td>sd</td>
</tr>
<tr>
<td>4yrs</td>
<td>0.00</td>
<td>%</td>
<td>0.0</td>
</tr>
<tr>
<td>5yrs</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6yrs</td>
<td>0.13</td>
<td>%</td>
<td>0.35</td>
</tr>
<tr>
<td>7yrs</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8yrs</td>
<td>0.73</td>
<td>%</td>
<td>0.96</td>
</tr>
<tr>
<td>9yrs</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.28</td>
<td>%</td>
<td>0.66</td>
</tr>
</tbody>
</table>
Appendices to Chapter 10

Figure 10a  The mean length of turn (MLT) (measured in T-units) in 75 N-children (Roelofs, 1998) and 120 PI-children

![Graph showing the mean length of turn (MLT) for N-children and PI-children.]

<table>
<thead>
<tr>
<th></th>
<th>4 yrs</th>
<th>5 yrs</th>
<th>6 yrs</th>
<th>7 yrs</th>
<th>8 yrs</th>
<th>9 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-chi</td>
<td>1.7</td>
<td>2</td>
<td>2.2</td>
<td>2.6</td>
<td>2.6</td>
<td></td>
</tr>
<tr>
<td>PI-chi</td>
<td>1.7</td>
<td>1.9</td>
<td>2.3</td>
<td>2.2</td>
<td>2.4</td>
<td>4</td>
</tr>
</tbody>
</table>

Figure 10b  The mean length of the longest turn (LLT) (measured in T-units) in 75 N-children (Roelofs, 1998) and 120 PI-children

![Graph showing the mean length of the longest turn (LLT) for N-children and PI-children.]

<table>
<thead>
<tr>
<th></th>
<th>4 yrs</th>
<th>5 yrs</th>
<th>6 yrs</th>
<th>7 yrs</th>
<th>8 yrs</th>
<th>9 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-chi</td>
<td>6.3</td>
<td>6.4</td>
<td>6.3</td>
<td>9.5</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>PI-chi</td>
<td>5.1</td>
<td>6.1</td>
<td>7.9</td>
<td>7.5</td>
<td>9.6</td>
<td>12.3</td>
</tr>
</tbody>
</table>
Appendices to Chapter 11

Figure 11a The percentage missed turn chances (calculated over the number of first pairparts expressed by the interviewer) in interviews with 75 N-children (Roelofs, 1998) and 100 PI-children.

Table 11a The percentage minimal responses expressed by the children as reaction to forms chosen to express a request for information and clarification by the interviewers in 75 N-children and 100 PI-children in the age of four to eight years.

<table>
<thead>
<tr>
<th>Minimal responses</th>
<th>N-children n=75</th>
<th>PI-children n=100</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Request Information</td>
<td>Request Clarification</td>
</tr>
<tr>
<td>Interrogative (%)</td>
<td>21%</td>
<td>9%</td>
</tr>
<tr>
<td>yes/no- question</td>
<td>13%</td>
<td>6%</td>
</tr>
<tr>
<td>wh-question</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>alt-question</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>tag-question</td>
<td>3%</td>
<td>0%</td>
</tr>
<tr>
<td>Imperative (%)</td>
<td>4%</td>
<td>0%</td>
</tr>
<tr>
<td>Declarative (%)</td>
<td>8%</td>
<td>2%</td>
</tr>
</tbody>
</table>
**Table 11b**  The percentage second pair parts (calculated over the number of first pair parts expressed by the interviewer) and the percentage second pair part functions Answer (A), Clarification (C), Acknowledgement (Ack) and Response (R) (calculated over all second pair parts) in interviews with 75 N-children (Roelofs, 1998) and 120 PI-children

<table>
<thead>
<tr>
<th>Functions 2'pp children</th>
<th>N-children n=75</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2e pp A C Ack R</td>
<td>2e pp A C Ack R</td>
</tr>
<tr>
<td>4 yrs</td>
<td>55% 29% 10% 6% 55%</td>
<td>33% 13% 4% 5%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>44% 25% 8% 6% 5% 48%</td>
<td>29% 13% 3% 3%</td>
</tr>
<tr>
<td>6 yrs</td>
<td>46% 28% 7% 6% 6% 42%</td>
<td>24% 10% 2% 6%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>39% 25% 5% 5% 4% 44%</td>
<td>26% 10% 3% 5%</td>
</tr>
<tr>
<td>8 yrs</td>
<td>42% 27% 5% 5% 6% 41%</td>
<td>25% 8% 2% 6%</td>
</tr>
<tr>
<td>Total Mean</td>
<td>45% 27% 7% 6% 5% 46%</td>
<td>27% 11% 3% 5%</td>
</tr>
</tbody>
</table>

**Figure 11b**  The percentage communicative contributions coded as extended discourse (calculated over all communicative contributions) in interviews with 75 N-children (Roelofs, 1998) and 120 PI-children.

<table>
<thead>
<tr>
<th></th>
<th>4 yrs</th>
<th>5 yrs</th>
<th>6 yrs</th>
<th>7 yrs</th>
<th>8 yrs</th>
<th>9 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-chi: % Extended discourse</td>
<td>49</td>
<td>50</td>
<td>57</td>
<td>58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PI-chi: % Extended discourse</td>
<td>46</td>
<td>54</td>
<td>50</td>
<td>55</td>
<td>64</td>
<td></td>
</tr>
</tbody>
</table>
### Table 11c
The percentage first pairpart functions, such as request for information, request for clarification and other (calculated over all first pairparts) in interviews with 75 N-children (Roelofs, 1998) and 120 PI-children

<table>
<thead>
<tr>
<th>First pairpart Functions</th>
<th>N-children n=75</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>reqin</td>
<td>reqclar</td>
</tr>
<tr>
<td>4 yrs</td>
<td>0.30%</td>
<td>0.52%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>0.30%</td>
<td>0.26%</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.10%</td>
<td>0.60%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>0.11%</td>
<td>0.78%</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.00%</td>
<td>0.87%</td>
</tr>
<tr>
<td>Total Mean %</td>
<td>0.16%</td>
<td>0.61%</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Appendices to Chapter 14

Table 14a  Proportion N-children (Roelofs, 1998:143) and PI-children that explicitly mark the story setting Total (TOT) by means of introducing the frog (Frog)(1) and that the boy possesses the frog (Possession)(2)

<table>
<thead>
<tr>
<th>Setting</th>
<th>N-children n=75</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frog</td>
<td>Possession</td>
</tr>
<tr>
<td>4 yrs</td>
<td>.93</td>
<td>.00</td>
</tr>
<tr>
<td>5 yrs</td>
<td>.93</td>
<td>.20</td>
</tr>
<tr>
<td>6 yrs</td>
<td>.93</td>
<td>.13</td>
</tr>
<tr>
<td>7 yrs</td>
<td>.86</td>
<td>.20</td>
</tr>
<tr>
<td>8 yrs</td>
<td>1.00</td>
<td>.66</td>
</tr>
<tr>
<td>Total</td>
<td>.93</td>
<td>.24</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 14b  Proportion N-children (Roelofs, 1998:143) and PI-children that explicitly narrative the initiating events boy asleep (3), frog leaves jar (4), boy awakes (5) boy finds jar (6), jar is empty (7) and frog is gone(8)

<table>
<thead>
<tr>
<th>Initiating events</th>
<th>N-children n=75</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TOT</td>
<td>-g-r</td>
</tr>
<tr>
<td>4 yrs</td>
<td>.93</td>
<td>.60</td>
</tr>
<tr>
<td>5 yrs</td>
<td>.67</td>
<td>.40</td>
</tr>
<tr>
<td>6 yrs</td>
<td>.86</td>
<td>.20</td>
</tr>
<tr>
<td>7 yrs</td>
<td>.100</td>
<td>.13</td>
</tr>
<tr>
<td>8 yrs</td>
<td>.100</td>
<td>.13</td>
</tr>
<tr>
<td>Total</td>
<td>.89</td>
<td>.29</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 14c  Proportion Search attempts +/location +/goal +/result total (TOT), search attempts +/location -goal -result (-g-r), search attempts +/location +goal -result (+g-r), search attempts +/location -goal +result (-g+r) and GAO-units (GAO) expressed by 75 N-children and 120 PI-children

<table>
<thead>
<tr>
<th>Search attempts +/location</th>
<th>N-children n=75</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOT</td>
<td>-g-r</td>
<td>+g-r</td>
</tr>
<tr>
<td>4 yrs</td>
<td>.93</td>
<td>.60</td>
</tr>
<tr>
<td>5 yrs</td>
<td>.67</td>
<td>.40</td>
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<tr>
<td>6 yrs</td>
<td>.86</td>
<td>.20</td>
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<td>8 yrs</td>
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<td>.13</td>
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<tr>
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<td>.89</td>
<td>.29</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
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De taalontwikkeling van kinderen met een psychiatrische stoornis

Claudia Blankenstijn en Annette Scheper

Deze dissertatie gaat over de morfologische/syntactische en semantische/pragmatische vaardigheden van Nederlandstalige kinderen met een psychiatrische stoornis in de leeftijd van vier tot tien jaar.

In de afgelopen jaren groeit in toenemende mate het besef dat taalstoornissen en psychiatrische stoornissen vaak samen voorkomen. In talrijke onderzoeken wordt aangenomen dat deze twee ontwikkelingsgebieden nauw samenhangen: taalgestoorde kinderen (Language Impaired children; LI-kinderen) hebben een verhoogde kans op een psychiatrische stoornis. Het omgekeerde geldt ook: kinderen die in behandeling zijn voor een psychiatrische stoornis (Psychiatric Impaired children; PI-kinderen) hebben vaak een taalstoornis. Waarom dit zo is en hoe deze relaties kunnen worden geïnterpreteerd is een actueel onderwerp van onderzoek en discussie. In deze dissertatie zijn we op zoek naar de eigenschappen van de taalproductie van kinderen met een psychiatrische stoornis. Wij onderzoeken de structurele eigenschappen zowel op het gebied van de morfologie/syntaxis als op het gebied van de semantiek/pragmatiek. Vervolgens geven we een eerste aanzet tot het onderzoek naar de relatie tussen specifieke talige profielen en specifieke typen psychiatrische stoornissen. Tot op heden is het causale verband tussen de twee stoornissen een ongelost probleem: het is nog onduidelijk of de psychiatrische stoornissen een oorzaak of een gevolg van de taalstoornis zijn, of dat deze stoornissen zich beide hebben ontwikkeld als resultaat van gemeenschappelijke, onderliggende, derde risico-factoren en dus aan elkaar gerelateerd en comorbid zijn vanaf het begin.

Hoewel het in kaart brengen van het causale verband tussen problemen in de taalontwikkeling en de sociaal-cognitieve ontwikkeling niet het onderwerp is van dit onderzoek, behoeft deze causaliteitskwestie toch enige aandacht, voordat we overgaan tot de linguïstische of taalkundige analyses. Het is zeer aannemelijk, dat de twee ontwikkelingsgebieden elkaar wederzijds beïnvloeden vanaf het begin. Vanuit een psycholinguïstisch oogpunt nemen we aan, dat taal een centrale rol speelt in de sociaal-cognitieve ontwikkeling. Communicatief taalgebruik is namelijk niet alleen één van de meest belangrijke vormen om sociale relaties met leeftijdgenoten en verzorgers op te bouwen en te onderhouden, maar voorziet kinderen tevens van het meest krachtige instrument om logisch te redeneren en te denken. Het ontwikkelen van deze redeneervaardigheden stelt kinderen in staat om conceptuele domeinen te onderscheiden op het gebied van de emotie, het gedrag en de cognitie. Alleen door middel van talige communicatie kunnen kinderen deze sociaal-cognitieve vaardigheden leren beheersen en verfijnen. Hoewel niet alle taalgestoorde kinderen ook stoornissen ontwikkelen op het gebied van de sociale cognitie, meestal
psychiatrische stoornissen genoemd, is vaak aangetoond dat taalstoornissen een ernstig negatief effect kunnen hebben op de sociaal-cognitieve ontwikkeling.

In het eerste inleidende hoofdstuk wordt beschreven wat wij onder een taalstoornis en een psychiatrische stoornis verstaan. Daarnaast geven we een gedetailleerd overzicht van de verschillende onderzoeken vanaf de jaren zeventig tot nu, waarbij de comorbiditeit van beide stoornissen een centrale plaats inneemt. We onderscheiden daarbij vier verschillende soorten onderzoekdesigns: (1) de prevalentie van taal- en psychiatrische stoornissen in grote groepen kinderen die at random geselecteerd zijn uit de totale populatie (epidemiologisch onderzoek); (2) de prevalentie van psychiatrische stoornissen (PI) bij LI-kinderen; (3) de prevalentie van taalstoornissen (LI) bij PI-kinderen; (4) de prevalentie van het aantal taalgestoorde kinderen waarbij na follow-up onderzoek een psychiatrische stoornis geconstateerd wordt.

Ons onderzoek valt binnen onderzoekdesign 3 de prevalentie van LI bij PI-kinderen. Alle uitgevoerde onderzoeken (onderzoekdesign 1, 2, 3 of 4) wijzen op een duidelijke comorbiditeit van LI en PI. We tonen aan dat wanneer de taalvaardigheden alleen globaal worden gemeten, de comorbiditeitsindex schommelt tussen de 33% en 89% met een gemiddelde van 50%. Wanneer de taalvaardigheden echter meer in detail zijn onderzocht, dan stijgt de comorbiditeitsindex zelfs tot boven de 80%. Dit betekent dat van alle onderzochte kinderen 80% zowel een taal- als een psychiatrische stoornis heeft. We signaleren ook, dat taalgestoorde kinderen een 4,5 keer verhoogde kans hebben op het ontwikkelen van een psychiatrische stoornis in vergelijking tot niet-taalgestoorde kinderen: hoe ernstiger de taalstoornis des te groter dit risico. Kinderen waarbij beide stoornissen, LI en PI, comorbide zijn noemen we LIPI-kinderen. Deze LIPI-kinderen hebben grotere taalverwerkingsproblemen en een grotere taalachterstand dan LI-kinderen zonder PI. Het is bekend, dat het dagelijks functioneren van deze LIPI-kinderen op school en thuis vaak voor een langere periode ernstig verstoord is.

In dit hoofdstuk wordt duidelijk dat er een te grote variatie is in de gerapporteerde comorbiditeitsindices. Daarom is het noodzakelijk om in de toekomst de symptomen van een LI zeer zorgvuldig te onderscheiden van de symptomen van een PI. We leggen ook uit, waarom LI en PI moeten worden gedifferentieerd van leerstoornissen. Verder behandelen we de comorbiditeitskwestie in dit onderzoek op twee manieren. In hoofdstuk 2 laten we zien hoe vanuit verschillende (ontwikkelings)theorieën de comorbiditeit tussen LI en PI zou kunnen worden voorspeld en verklaard. In de hoofdstukken 4 tot en met 14 geven we een gedetailleerde beschrijving van de morfologische/syntactische en semantische/pragmatische kenmerken van LI in PI-kinderen.

De verschillende (ontwikkelings)theorieën die de revue passeren in hoofdstuk 2 zouden de hoge comorbiditeit van LI en PI in individuele kinderen moeten voorspellen en verklaaren. Deze theorieën behandelen de ontwikkeling van linguïstische en sociaal-cognitieve vaardigheden en zijn gerangschikt op het
continuüm van sterk nativistisch tot sterk empirisch van aard. Op de eerste plaats worden theorieën besproken, die betrekking hebben op informatieverwerkingsprincipes, die een voorwaarde zijn voor een normale taalontwikkeling en ontwikkeling van sociaal-cognitieve vaardigheden van een kind. Deze theorieën zijn de Executive Functioning Theory en de Central Coherence Theory. De Executive Functioning Theory veronderstelt een goed functionerend triad van mechanismen, die zorg dragen voor het kunnen uitvoeren van verschillende cognitieve functies, namelijk Motivatie, Aandacht en (korte termijn) Geheugen (Motivation, Attention en Memory (MAM)). De Central Coherence Theory gaat ervan uit dat kinderen het vermogen hebben om perceptuele informatie te integreren tot een samenhangend geheel. Als er sprake is van een dysfunctie op het gebied van MAM en de Centrale Coherentie, dan verstoort dit zowel de taal- als de sociaal-cognitieve ontwikkeling.

Op de tweede plaats worden de theorieën 'from the inside-out' besproken, zoals de Modularity Theory, Principles and Parameters Theory van Chomsky en Connectionist Theory. Deze theorieën leunen zwaar op een genetische component die verantwoordelijk is voor veranderingen tijdens de ontwikkeling. Vanuit dit theoretisch perspectief wordt er geen specifieke richting aan het causale verband tussen taal- en sociaal-cognitieve vaardigheden aangegeven. Wij leiden af dat de Modularity Theory en Connectionist Theory het onafhankelijk aanwezig zijn van LI en PI bij één kind niet uitsluiten.


Samenvattend kunnen we zeggen, dat relatief weinig (ontwikkelings)theorieën de causale relatie tussen LI en PI voorszeggen en verklaren, behalve de Executive Functioning Theory, de Central Coherence Theory, die betrekking hebben op het verwerken van informatie en voorspellen dat LI en PI elkaar wederzijds beïnvloeden en comorbiditeit zijn vanaf het begin, en de theorieën 'from the outside-in', die voorspellen dat LI een PI veroorzaakt.

In hoofdstuk 3 wordt de onderzoeksmethode uiteengezet. In het onderzoek zijn 120 Nederlandstalige kinderen met een psychiatrische stoornis in de leeftijd van vier tot tien jaar betrokken. Het talige functioneren van de PI-kinderen wordt afgezet tegen twee vergelijkingsgroepen: (1) 75 Nederlandstalige kinderen met een normale taalontwikkeling (N-kinderen), afkomstig uit het onderzoek van Roelofs (1998), en (2) 240 Nederlandstalige kinderen met een normale taalontwikkeling (N-kinderen), afkomstig uit het Spontane Taal Analyse Procedure-onderzoek (STAP) (Van den Dungen en Verbeek, 1994, 1999). Wij hebben spontane taal van de PI-kinderen
Samenvatting in het Nederlands

verzameld aan de hand van twee genres: een conversationeel interview volgens de richtlijnen van STAP en een narratie met behulp van het verhaal 'Kikker, waar ben je?' (Frog, where are you?), beter bekend als de Frog story (Mayer, 1969). De transcriptie en segmentatie is gedaan aan de hand van CHAT (CHILDES) en de analyses zijn uitgevoerd met behulp van CLAN (CHILDES) (MacWhinney, 1995). Naast spontane taal hebben we ook taalgegevens met behulp van de Taaltests voor Kinderen (TvK) (Van Bon en Hoekstra, 1982) verkregen op het gebied van de receptieve en productieve taalvaardigheden op woord- en zinsniveau.
De populatie PI-kinderen is geselecteerd aan de hand van specifieke selectiecriteria. Alle PI-kinderen zijn monolinguïaal Nederlands, cognitief normaal functionerend (IQ>70) en hebben geen bijkomende stoornissen, zoals slechthorendheid of slechtziendheid. Kinderen met autisme en schizofrenie werden niet betrokken in het onderzoek. De geselecteerde PI-kinderen vertonen de volgende psychiatrische problematiek: (1) externaliserende stoornissen, zoals Attention Deficit Hyperactivity Disorder (ADHD) en Oppositional Behaviour Disorder, (2) internaliserende stoornissen, zoals Anxiety Disorder en Depression en (3) een combinatie van externaliserende en internaliserende symptomen, zoals Pervasive Developmental Disorder Not Otherwise Subscribed (PDD NOS) en 'Geen Diagnose' (DSM-IV-TR, APA, 2000).

In het kort worden de morfologische/syntactische (MS) en semantische/pragmatische (SP) analysemodellen beschreven. De MS-analyse richt zich op de realisatie van lexicale en functionele categorieën, in het bijzonder op de grammaticaliteit, connectiviteit, transitiviteit, temporaliteit en complexiteit van de conversationele vaardigheden van PI-kinderen. Ook worden de MS-vaardigheden van de PI-kinderen in de conversatie vergeleken met de MS-vaardigheden tijdens het vertellen van het kikkerverhaal (geme-vergelijking). De SP-analyse richt zich op de vaardigheid van soepele beurtwisselingen, responsiviteit, ontwikkeling van het gespreksonderwerp (topic), cohesie en coherentie van PI-kinderen. Ook wordt er onderzocht of PI-kinderen de plotstructuur van het kikkerverhaal kunnen uitdrukken.

Normaal ontwikkelende Nederlandstalige kinderen hebben in principe rond de leeftijd van zes jaar een basis voor de morfologie en de syntaxis van hun taal gelegd, terwijl de verwerving van semantische/pragmatische vaardigheden rond het tiende levensjaar bereikt wordt, waarbij kinderen communicatieve functies kunnen combineren in dienst van een overkoepelend doel.
Het gedetailleerde spontane taalonderzoek van twee genres, een conversationeel interview en een verhaal naar aanleiding van het plaatjesboek de Frog story, richt zich op verschillende vaardigheden binnen de morfologie/syntaxis (MS) en semantiek/pragmatiek (SP) met als doel een zo volledig mogelijk taalprofiel van kinderen met een psychiatrische stoornis te krijgen, waarop linguïstische en psychiatrische diagnostiek en therapie zo goed mogelijk kunnen aansluiten.

De hoofdstukken 4 tot en met 9 hebben betrekking op de ontwikkeling van morfologische/syntactische (MS) vaardigheden van PI-kinderen. In hoofdstuk 4 staat de grammaticaliteit van PI-kinderen centraal. Uit de MS-analyse blijkt, dat veel PI-kinderen minder goed in staat zijn om verplichte syntactische informatie te
realiseren dan N-kinderen. 82% van de PI-kinderen produceren significant meer grammaticaal onvolledige en grammaticaal foutieve zinnen, die bijvoorbeeld gekenmerkt worden door het weglaten van verplichte elementen van de argumentstructuur bij het werkwoord of het gebruiken van een onjuiste congruentie tussen het subject (onderwerp) en het predicaat (werkwoord). Het is opmerkelijk dat zelfs de oudste PI-kinderen nog significant meer fouten maken dan de jongste N-kinderen uit het onderzoek. Deze resultaten wijzen op een ernstig vertraagde morfologische/syntactische ontwikkeling bij PI-kinderen.

Het meest typend voor PI-kinderen is dat hun uitingen een verdichting van twee of meer grammaticale fouten en/of weglatingen laat zien, zodat een PI-kind in een gesprek met een kind of een volwassene onduidelijke informatie uitwisselt, waardoor een optimale communicatie niet meer mogelijk is. Vooral de kinderen met externepsychiatrische stoornissen en PDD-NOS laten deze typerende opeenstapeling van fouten en weglagen zien, hoewel deze problemen ook voorkomen bij een aantal PI-kinderen met internaliserende stoornissen en 'Geen Diagnose'.

In de hoofdstukken 5 tot en met 9 staat een gedetailleerde morfologische/syntactische (MS) analyse centraal met als doel die specifieke MS-variabelen te ontdekken die een bijdrage leveren aan de ernstig vorm van (verdichte) ongrammaticaliteit, die gevonden is bij een substantiële groep PI-kinderen.

Hoofdstuk 5 richt zich op het ontbreken van lexicaal categorieën, zoals werkwoorden, naamwoorden, adjectieven en preposities. Lexicaal categorieën zijn afhankelijk van functionele categorieën, de zogenaamde grammaticaal 'hoofden' van een zin, zoals de complementizer positie voor het genereren van samentrekkingen en onderschikkingen (bijzinnen), inflectionele morfologie, bepalers van een naamwoordconstituut en negatie (Chomsky, 1981). Binnen linguïstisch onderzoek neemt het werkwoord of het predicaat met zijn argumentstructuur een belangrijke plaats in. De semantiek van het werkwoord is bepalend voor de uiteindelijke zinsstructuur: de handeling die het werkwoord semantisch uitdrukt (bijvoorbeeld de handeling 'maken') bepaalt de semantische rollen die verplicht in de zin zijn en de volgorde van deze rollen oplevert: 'Harmen maakt een hut'. De semantische rollen van een handeling genereren zo een syntactische structuur met een vaste volgorde die taalspecifiek is en de kern van de zin vormt.

Veel PI-kinderen laten significant vaker het verplichte werkwoord en verplichte argumenten, zoals het subject of het object, foutief weg in vergelijking met N-kinderen. Het ontbreken van een werkwoord in een zin leidt tot een statische omschrijving zonder een uitgedrukte handeling. Het subject is doorgaans in het Nederlands een verplicht onderdeel van de zin en mag alleen onder speciale condities weggezet worden. Indien het subject op de eerste positie van de zin staat (plaatsconditie) en de referent van het subject duidelijk is (referentconditie), dan is het geoorlooft het subject weg te laten. De verplichtheid van een direct object is afhankelijk van de semantiek van het werkwoord. In het geval van een verplicht
object werkwoord is het alleen geoorloofd een object weg te laten, indien een weggelaten object aan de plaats- en referentconditie voldoet. In alle andere gevallen levert het weglaten van een object of een subject een ongrammaticale zin op. Het weglaten van argumenten leidt tot een geminimaliseerde zin, die onvoldoende informatie bevat. Naast de kern van de zin kunnen ook optionele elementen aan de zin toegevoegd worden, zoals bijwoorden en preposities. PI-kinderen laten niet alleen vaak onderdelen van de kern van de zin weg, maar ook de door de context verplichte zinsonderdelen die plaats en tijd uitdrukken ontbreken vaak. De resultaten van de PI-kinderen op het gebied van de realisatie van lexicale categorieën zijn niet exclusief voor deze populatie, aangezien vergelijkbare problemen ook zijn gevonden bij Nederlandstalige kinderen met een Specifieke Taalstoornis (Specific Language Impairment (SLI)) (De Jong, 1999). Samenvattend kunnen we zeggen, dat veel PI­kinderen Ernstige problemen hebben om hun dagelijkse ervaringen via grammaticaal correcte zinnen te verwoorden.

In hoofdstuk 6 zijn de morfologische/syntactische fouten in het gebruik van lexicale categorieën in het conversationele interview onderzocht. Uit hoofdstuk 5 bleek dat PI-kinderen significant vaker verplichte informatie weglaten, maar in hoofdstuk 6 wordt aangetoond, dat PI-kinderen ook significant vaker fouten maken in de realisatie van deze categorieën: ze selecteren meer semantisch foutieve preposities en bijwoorden. Daarnaast vinden we significant vaker woordvolgordefouten bij PI-kinderen in vergelijking tot N-kinderen, die een indicatie zijn voor de problemen met de taalspecifieke opbouw van het zinsframe. Veel PI-kinderen hebben moeite met de juiste plaatsing van zinselementen ten opzicht van elkaar, waardoor de informatievoorziening niet optimaal verloopt. In principe staat in het Nederlands het subject op de eerste zinspositie en wordt gevolgd door het werkwoord. Vooral zinnen die afwijken van deze standaardvolgorde zijn problematisch voor PI-kinderen. Dit is bijvoorbeeld het geval bij zinnen waarbij een element voorop geplaatst is, zoals een bijwoord ('toen'), waardoor het subject niet voor het werkwoord komt te staan, maar verplaatst moet worden naar de positie achter het werkwoord ('toen ging Eva slapen') (subject-werkwoord inversie). Er is zelfs een subgroep PI-kinderen, die twee maal zoveel fouten in de woordvolgorde maakt in vergelijking met de N-kinderen. Alhoewel volgordefouten bij Nederlandstalige SLI-kinderen niet voorkwamen, werden ze wel gevonden bij Zweedse kinderen met SLI.

Het gebruik van functionele categorieën in het conversationele interview van PI-kinderen wordt onderzocht in hoofdstuk 7. Functionele categorieën worden uitgedrukt door het gebruik van grammaticale gebonden morfemen op het gebied van de werkwoordsinflexie (tijdsmerking van de onvoltooid verleden tijd) en congruentierelaties (tussen het subject en het werkwoord en tussen een bepaalder en een zelfstandig naamwoord). Opvallend is dat PI-kinderen geen moeite hebben met de morfologische realisatie van de onvoltooid verleden tijd in tegenstelling tot Nederlandstalige SLI-kinderen (De Jong, 1999). Wat PI-kinderen wel significant onderscheidt van de N-kinderen, is het niet goed vast kunnen houden aan de tijdslijn over de uitingen heen: veel PI-kinderen switchen in het gesprek van de tegenwoordige naar de verleden tijd ondanks het feit dat de context tot een verleden...
tijd verplicht. Deze problemen duiden echter op aanwezige problemen met het uitdrukken van cohesieve relaties op semantisch/pragmatisch gebied.

De resultaten op het gebied van de subject-werkwoord congruentie laten zien dat PI-kinderen geen infinitief morfologie meer hebben, maar bijna altijd een vervoegd werkwoord in tweede zinspositie gebruiken. Ook produceren ze niet vaker een overgegeneraliseerde werkwoordsvorm. Alleen de overeenstemming tussen het subject en het werkwoord in getal (enkelvoud subject - meervoud werkwoord en vice versa) gaat significant vaker fout in vergelijking met N-kinderen.

Veel PI-kinderen maken de meeste fouten met het niet-realiseren van een bepaler in een naamwoordgroep, met name met het gebruik van het lidwoord. Vaak onbreekt het hoofd van de naamwoordgroep, waardoor dit zinsdeel niet verbonden is met de rest van de zin. De resultaten op het gebied van de tijdsmarkering en congruentie leveren geen aanwijzingen op voor het bestaan van een op zichzelf staand grammaticaal deficiënt, zoals dat wordt verondersteld in specifieke subpopulaties met SLI, maar de problemen van de PI-kinderen lijken eerder gerelateerd te zijn aan problemen met co-referentiële cohesie of aan onderliggende problemen met het verwerken van informatie.

In hoofdstuk 8 worden de morfologische/syntactische complexiteit op het gebied van de connectiviteit en transitiviteit van PI-kinderen beschreven. Ondanks het veelvuldig weglaten van verplichte elementen, zoals het werkwoord of het subject, produceren de meeste PI-kinderen toch een normale uitingenlengte die leeftijdsadequaat is. Veel PI-kinderen hebben moeite met gereduceerde structuren, zogenaamde elliptische antwoorden (of clausale elliptische constructies), die deels afhankelijk en gerelateerd zijn aan de voorgaande uiting van de interviewer. PI-kinderen maken significant vaker fouten in het geven van deze elliptische antwoorden, aangezien ze niet goed kunnen onderscheiden wat oude en nieuwe grammaticale informatie is in vergelijking met N-kinderen. Het resultaat is dat de informatie onvoldoende overgebracht kan worden en een negatieve uitwerking heeft op de communicatie.

Door middel van het produceren van samentrekkingen en onderschikkingen is het mogelijk om een complex idee om te zetten in hierarchisch, gerelateerde (deel) uitingen. Alhoewel PI-kinderen evenveel van deze syntactisch complexe structuren realiseren in vergelijking tot N-kinderen, laten ze significant vaker de verbindingsplaats (complementizer positie) tussen twee (deel)uitingen leeg, waardoor de twee (deel)uitingen niet met elkaar verbonden zijn. Doordat deze niet-verbonden (deel)uitingen losse informatie-units blijven, dragen ze niet bij aan een duidelijke informatievoorziening van een overkoepelend idee. Het gevolg is dat veel PI-kinderen onvoldoende in staat zijn om causaal gerelateerde gebeurtenissen uit het dagelijkse leven of uit verhalen uit te drukken.

Ook op het gebied van de transitiviteit van werkwoorden gedragen PI-kinderen zich significant anders dan de N-kinderen. Het semantische scenario van werkwoorden is richtinggevend voor het frame van de zin: welke thematische rollen moeten er uitgedrukt worden. Verplichte object werkwoorden (of transitieve werkwoorden) genereren zinnen met de meest volledige argumentstructuur. Alhoewel PI-kinderen significant vaker een verplicht object weglaten, produceren ze wel net zoveel
verplichte object werkwoorden als de N-kinderen. Wat de PI-kinderen echter significant onderscheidt van de N-kinderen is een relatieve voorkeur voor koppelwerkwoorden en intransitieve werkwoorden, die geen verplicht object hoeven hebben of er zelfs geen mogen hebben.

In overeenstemming hiermee hebben veel PI-kinderen ook een voorkeur voor semantisch minder complexe werkwoorden. In de eerste plaats gebruiken PI-kinderen meer 'semantisch lichte' werkwoorden — een beperkte set werkwoorden die vaak voorkomen en naar betekenis weinig specifiek zijn, zoals 'gaan' en 'doen' — vergelijkbaar met taalgestoorde kinderen en kinderen met SLI. Het gebruik van een beperkte set van werkwoorden beïnvloedt de set van argumentstructuren die een PI-kind verwerft. In de tweede plaats produceren PI-kinderen significante vaker een partikelwerkwoord, waarbij een partikel de plaats inneemt van een prepositiepersele object en de uitsprong ligt reducteer. Samenvattend kunnen wij zeggen dat veel PI-kinderen beduidend minder complex zijn in hun taaluitingen in vergelijking met N-kinderen. PI-kinderen lijken wat betreft hun geringe vermogen om morfologisch/ syntactisch complexe zinstructuren te produceren op Nederlandstalige kinderen met SLI.

In hoofdstuk 9 is de prestatie van PI-kinderen in het conversationele en het narratieve genre vergeleken op een nagenoeg identieke set van morfologische/ syntactische variabelen. Er is onderzocht of de vaardigheden van PI-kinderen op morfologisch/syntactisch gebied (hoofdstuk 4 tot en met 8) vergelijkbaar waren met de vaardigheden die nodig zijn bij het vertellen van een verhaal naar aanleiding van het plaatjesboek de Frog story. In dit verhaal is een jongetje op zoek naar zijn weggelopen kikker. Het plaatjesverhaal is morfologisch/syntactisch complexer dan de conversatie, aangezien de gebeurtenissen die uitgedrukt moeten worden voor een deel vastliggen: de informatie op de plaatjes dwingt de keuze tot een specifieke handeling met een specifieke argumentstructuur en markeringen van plaats en tijd af.

Zoals verwacht, vertonen de morfologisch/syntactische narratieve vaardigheden van veel PI-kinderen nog ernstigere problemen dan dit het geval is bij het conversationele interview. PI-kinderen laten een nog grotere ongrammaticaliteit zien tijdens het vertellen van het verhaal in vergelijking tot het gesprek. PI-kinderen hebben problemen op het gebied van de temporaliteit. PI-kinderen laten te vaak de handeling (werkwoord) weg bij het beschrijven van de gebeurtenissen op de plaatjes, waardoor de kinderen niet-gerelateerde statische beschrijvingen geven van de gebeurtenissen. Ook is er een subgroepje PI-kinderen dat tijdens het vertellen van het verhaal moeite heeft een overkoepelende tijdslijn vast te houden. Deze PI-kinderen maken nog geen gebruik van overwegend één werkwoordstijd voor het verwijzen naar gebeurtenissen (dominante tijdsverkooping), maar gebruiken de tegenwoordige en verleden tijd nog door elkaar (een mix van tijdsverkooping). Het mixen van tijden tijdens het vertellen van de Frog story is typerend voor jonge N-kinderen. Verder worden er problemen gevonden op het gebied van de transitiviteit. Bij het vertellen van het verhaal leunen PI-kinderen zwaar op niet-verplichte object werkwoorden, zoals intransitieve werkwoorden, terwijl juist de verplichte object werkwoorden nodig zijn om de complete gebeurtenis (handeling met de argument-

Samenvattend kunnen we zeggen, dat veel PI-kinderen ernstige problemen hebben op het gebied van de morfologie/syntaxis in beide genres, zowel in het conversationele interview als in de narratie. In vergelijking tot de N-kinderen produceren de PI-kinderen veel meer grammaticale fouten en weglatingen en is vooral de verdichting van deze grammaticale onvolkomenheden per uiting opvallend. De morfologische/syntactische problemen zijn aanwezig bij het uitdrukken van alle lexicale categorieën, maar doen zich ook voor bij specifieke functionele categorieën. Verder valt het op, dat de uitingen van PI-kinderen, die wel goed gerealiseerd worden, een te lage complexiteit vertonen om tot een optimale informatie-voorziening te komen. Dit blijkt vooral uit het gebruik van teveel semantisch lichte werkwoorden en teveel partikelwerkwoorden. Veel morfologische/ syntactische problemen blijken samen te hangen met semantische/pragmatische problemen (hoofdstuk 10 tot en met 14). Veel PI-kinderen hebben onvoldoende morfologische/ syntactische middelen tot hun beschikking voor het aangaan van een adequaat communicatief taalgebruik met leeftijdgenoten of volwassenen.

De hoofdstukken 10 tot en met 14 hebben betrekking op de ontwikkeling van semantische/pragmatische vaardigheden in twee genres. In het vraaggesprek hebben we niet alleen het vermogen om soepel de beurt te wisselen geanalyseerd, maar ook het vermogen om langere beurten te produceren. Daarnaast hebben we gekeken naar het vermogen om miscommunicatie te repareren en om uitgebreid te antwoorden. Vervolgens hebben we onderzocht of de PI-kinderen in vergelijking tot de N-kinderen in staat zijn om relevante informatie te verstrekken. We hebben geanalyseerd of de PI-kinderen een gesprekonderwerp kunnen continueren door middel van opeenvolgende uitingen die coherent en cohesief met elkaar zijn verbonden. Voor het geven van coherente antwoorden is het nodig dat kinderen zich houden aan het zogenaamde coöperativiteitsprincipe (Grice, 1975) en dat zij de vier semantische/pragmatische vuistregels toepassen die onder dit principe vallen. Dit houdt bijvoorbeeld in dat kinderen een antwoord inhoudelijk en intentioneel goed laten aansluiten op een vraag, maar ook dat zij rekening houden met de voorkennis en het perspectief van de luisteraar. Deze twee laatste vaardigheden zijn onderdeel van de ontwikkeling van een Theory-of-Mind. Alleen zó leren kinderen om niet te veel redundant, maar ook om niet juist te weinig talige informatie te verstrekken. Voor het produceren van cohesief verbonden uitingen moeten kinderen ook bepaalde semantische/pragmatische regels toepassen. We bekijken drie taalvaardigheden waarbij het vermogen om uitingen cohesief te verbinden een
cruciale rol speelt. Cohesief verbonden uitten komen de begrijpelijkheid, de nieuwswaarde en dus de relevantie van wat het kind zegt ten goede.

De eerste van deze drie vaardigheden is het antwoorden met clausale ellipsis constructies, zoals wanneer een kind reageert op de vraag 'heb je huisdieren?' met het antwoord 'een hond'. Om antwoord en vraag goed cohesief te verbinden moet het kind dus leren om bepaalde woorden weg te laten in dit soort constructies. De tweede van deze drie vaardigheden heeft betrekking op het cohesief verbinden van uitten met behulp van het expliciet uiten van nevenschikende en onderschikende voegwoorden. De laatste drie van deze vaardigheden is het meest belangrijk en heeft betrekking op het vermogen om duidelijk en begrijpelijk te refereren aan entiteiten, zoals personen en dieren, waarover het in het vraaggesprek gaat.

In het narratieve genre kijken we naar ditzelfde verschijnsel, zodat een vergelijking van de vaardigheid om duidelijk te verwijzen in beide genres mogelijk is. Verder onderzoeken we of de PI-kinderen in staat blijken te zijn om het hele verhaal in te bedden in de verhaaltijd die anders is dan de actuele spreektijd. Ook analyseren we hoe kinderen de overkoepelende plotlijn van het verhaal verwoorden. Uiteindelijk leveren deze gedetailleerde analyses een schat aan informatie op over hoe de taalontwikkeling van PI-kinderen op het gebied van de semantiek/pragmatiek anders verloopt dan die van N-kinderen. Dit zal in wat volgt kort worden beschreven.

Uit de analyse met betrekking tot beurt nemen, blijkt in hoofdstuk 10 dat de PI-kinderen in het genre van het vraaggesprek meer niet soepele beurtwisselingen maken dan de N-kinderen. Deze ontstaan doordat een PI-kind te lang te pauzeert alvorens de beurt te nemen, doordat zowel PI-kind als PI-interviewer tegelijk een nieuwe beurt starten, of doordat een PI-kind de PI-interviewer interrumpeert. Het makkelijk beurtwisselen is een basistaal vaardigheid. Verstoringen van de beurtwisseling hebben een negatief effect op de communicatie. Verder blijken vooral de oudere PI-kinderen van zes tot tien jaar moeite te hebben om langere beurten te produceren. Korte beurten kunnen wijzen op een onvermogen om met anderen te (wilden) communiceren. Bovendien blijkt dat sommige PI-kinderen extreem korte beurten maken, terwijl anderen juist excessief spreken. Deze PI-kinderen produceren te lange incoherente beurten. Naast een te kort aan inhoudelijke samenhang, worden deze beurten ook gekenmerkt door veel morfologische/syntactische fouten. Dit excessieve spreken als symptoom van een semantische/pragmatische communicatiestoornis blijkt echter niet exclusief aan kinderen met ADHD of PDD-NOS toegeschreven te kunnen worden, maar ook aan bijvoorbeeld enkele kinderen met een internaliserende psychiatrische stoornis.

Het soepel wisselen van de beurt tijdens een gesprek en het maken van langere beurten is essentieel voor het goed communiceren met anderen. Uit hoofdstuk 10 blijkt dat veel PI-kinderen hier ernstige problemen mee hebben.

In hoofdstuk 11 onderzoeken we de responsiviteit van de PI-kinderen en het vermogen om miscommunicatie te repareren. De PI-interviewers blijken een communicatie stimulerende interviewstijl te hanteren. Zo krijgen de PI-kinderen veel tijd om te reageren en krijgen zij ook veel positieve feedback. Daarnaast structureren
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De PI-interviewers het vraaggesprek inhoudelijk voor de PI-kinderen. Deze interviewstijl blijkt voor een deel een positieve invloed op de responsiviteit van de PI-kinderen te hebben. De PI-kinderen missen bijvoorbeeld even frequent als de N-kinderen (incidenteel) een beurtkans. Verder blijkt er tussen de twee populaties geen significant verschil te zijn in het aantal tweede paarden (bijvoorbeeld een antwoord) als reactie op eerste paarden van de interviewer (bijvoorbeeld een vraag). Ook blijkt dat de PI-kinderen evenveel anekdotes, ervaringen of gebeurtenissen verwoorden als de N-kinderen. Deze beurten bestaan uit uitgebreidere antwoorden van opeenvolgende uitingen en vallen onder de noemer *extended discourse met een narratief karakter*. In de wetenschap dat relatief veel PI-kinderen moeite hebben met het maken van een langere beurt, nemen we aan dat de PI-kinderen veel, maar relatief korte narratieve beurten nemen en de N-kinderen minder, maar relatief langere narratieve beurten.

Ondanks de hulp van de interviewer, geven de PI-kinderen, zelfs in de oudste leeftijdsgroepen, echter significant meer *minimale responsen* in de vorm van een (niet)verbaal ja/nee-antwoord dan de N-kinderen. Minimale responsen komen vooral voor als antwoord op vragen met een indirecte intentie en/of een niet-letterlijke betekenis. We leiden hiervan af dat de PI-kinderen semantische/pragmatische problemen hebben met het begrijpen van indirecte communicatieve handelingen en overdrachtelijk taalgebruik.

Niet alleen het taalbegrip, maar ook de taalproductie kan problemen opleveren. Zo blijkt het geven van duidelijke en begrijpelijke informatie in deze langere narratieve beurten een ernstig probleem voor veel PI-kinderen. Daardoor moet aan de PI-kinderen vaker om opheldering gevraagd worden dan aan de N-kinderen. Meestal zijn de PI-kinderen net als de N-kinderen zich ervan bewust dat de interviewer in een vraaggesprek de aangewezen persoon is om de vragen te stellen. Als kinderen dan toch een vraag stellen, blijkt dat de PI-kinderen significant minder vragen om opheldering dan de N-kinderen. Wel stellen sommige PI-kinderen pragmatisch gemanierde *vragen om informatie* aan de interviewer. Dit gedrag toont aan dat deze PI-kinderen moeite hebben met hun gespreksrol en het in acht nemen van sociale distantie. Het toont ook aan dat sommige PI-kinderen problemen kunnen hebben met het oplossen van miscommunicatie, al is bekend dat ook zich normaal ontwikkelende leeftijdgenootjes vaak uit beleefdheid of vanuit de misvatting dat volwassenen alles weten geen verbale initiatieven nemen om miscommunicatie op te lossen.

Het oplossen van miscommunicatie en het geven van begrijpelijke en voldoende informatie als antwoord op directe en indirecte vragen is echter essentieel voor het communiceren met anderen. Uit hoofdstuk 11 blijkt dat veel PI-kinderen hier semantische/pragmatische problemen mee hebben.

In hoofdstuk 12 onderzoeken we de manier waarop in interviews met PI-kinderen en N-kinderen het handhaven van een bepaald gespreksonderwerp verloopt. Uit de analyse blijkt dat het voortzetten van het gesprek in interviews met PI-kinderen anders verloopt dan in interviews met N-kinderen. Om de PI-kinderen te helpen met het continueren van het gesprek, gebruiken de PI-interviewers vaker de strategie van *topic shading*. Dit betekent, dat het ene gespreksonderwerp losjes aan het andere
wordt gekoppeld zonder een bepaald gespreksonderwerp tot in detail te bespreken. Ondanks deze hulp, zijn de PI-kinderen niet zo goed als de N-kinderen in het geven van nieuwe en dus meer relevante informatie over een bepaald onderwerp. Significant meer uitingen van de PI-kinderen betreffen een herhaling van oude, en dus redundante informatie. De PI-kinderen kunnen maar moeilijk in detail over één gespreksonderwerp praten en hun bijdragen aan het onderwerp van gesprek zijn vaak alleen zijdelings aan elkaar gerelateerd, want het zijn juist de PI-kinderen die de strategie van topic shading initiëren. Dit in tegenstelling tot de N-kinderen die wel in staat blijken te zijn om vaker een gespreksonderwerp meer in detail uit te werken. Vervolgens analyseren we het vermogen van de PI-kinderen om relevante talige informatie te verstrekken volgens het coöperativiteitsprincipe van Grice (1975). We gebruiken hiervoor het Nederlandse model dat is ontwikkeld door Roelofs (1998). Aan de hand van dit analysemmodel kunnen uitingen beoordeeld worden als coherent of incoherent. Het vermogen om coherente (aan elkaar op relevante wijze inhoudelijk gerelateerde) informatie te geven is één van de taalvaardigheden die exponentieel groeit in de basisschoolleeftijd. Dit leerpads gaat echter niet zonder vallen en opstaan. Ook de N-kinderen schenden regelmatig nog de vier vuistregels van dit principe (Roelofs, 1998), zoals door het geven van te veel (redundante) of te weinig informatie. De PI-kinderen verschillen weinig van de N-kinderen in dit opzicht, alleen produceren de PI-kinderen significant meer incoherent uitingen. Zij produceren niet alleen meer plotselinge, abrupte veranderingen van het gespreksonderwerp, maar zij negeren ook vaker de vraag van de interviewer. Ook gezien zij vaker een antwoord dat niet exact aansluit op de inhoud of intentie van de vraag. De PI-kinderen geven significant vaker te weinig informatie, zodat er een haat in de informatievoorziening ontstaat. Het is opmerkelijk dat de PI-kinderen niet meer onnodige uitweidingen over een bepaald gespreksonderwerp produceren dan de N-kinderen. Dit komt doordat de PI-kinderen moeite hebben met het geven van nieuwe, gedetailleerde informatie. Zoals al eerder is opgemerkt, herhalen de PI-kinderen juist vaker dan de N-kinderen een deel van alle uitingen min of meer letterlijk. Dit kan te maken hebben met (korte termijn) geheugenproblemen. De PI-kinderen herhalen echter significant minder vaak woorden of woordgroepen dan de N-kinderen. Dit is te verkleden doordat veel PI-kinderen vaak essentiële zinsonderdelen beginnen weg te laten en/of veel zinnen beginnen te produceren van een geringe complexiteit. Hierdoor wordt de kans op woord of woordgroepen herhalingen verminderd. Het meest opmerkelijke resultaat van de analyse van incoherent uitingen is dat de PI-kinderen significant meer dubbelzinnige, niet eenduidige, onware of tegenstrijdige informatie geven dan de N-kinderen. Dit verschijnsel vermindert met een toenemende leeftijd. Het voortzetten van een bepaald gespreksonderwerp in detail en het vermogen om relevante, coherente informatie te verstrekken volgens het coöperativiteitsprincipe van Grice (1975) is essentieel voor het goed communiceren met anderen. Uit hoofdstuk 12 blijkt, dat veel PI-kinderen op dit vlak ernstige semantische/pragmatische problemen hebben.
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In hoofdstuk 13 bekijken we het vermogen van de PI- en N-kinderen om relevante, cohesieve informatie te verstrekken. Het cohesief verbinden van uitingen kan met behulp van de volgende middelen: (1) het weglaten van informatie in clausale ellipsis constructies (elliptische antwoorden) en (2) het expliciet vermelden van nevenschikende en onderschikkende voegwoorden, en (3) het eenduidig en duidelijke verwijzen naar bepaalde entiteiten die worden genoemd in het vraaggesprek. Het op deze wijze cohesief verbinden van uitingen levert een positieve bijdrage aan de communicatie met anderen.

Uit hoofdstuk 13 blijkt echter, dat veel PI-kinderen problemen hebben met het cohesief verbinden van uitingen. Zoals al eerder is genoemd, gebruiken zij significant meer clausale ellipsis constructies dan de N-kinderen, maar maken de PI-kinderen significant meer fouten in de cohesieve aaneensluiting tussen vraag en antwoord. Zij laten namelijk vaak te veel of te weinig informatie weg of gebruiken woorden, die inhoudelijk onvoldoende op elkaar aansluiten zodat een cohesief verband ontbreekt. Vergelijkbare problemen doen zich voor bij het gebruik van de voegwoorden. De PI-kinderen gebruiken niet alleen minder voegwoorden, maar maken ook meer, voornamelijk semantische fouten bij het gebruik van voegwoorden.

Het meest opvallend, en wellicht ook het meest storend in de interactie, is dat de PI-kinderen significant meer onduidelijke referenten produceren dan de N-kinderen. Dit onduidelijke en incohesieve verwijzen naar entiteiten, personen of dieren waarover het gesprek gaat, verhoogt de kans om niet begrepen te worden. Een substantieel deel van alle onduidelijke referenten is gerelateerd aan morfologische/syntactische problemen. De PI-kinderen laten bijvoorbeeld vaak verplichte argumenten op foutieve wijze impliciet (onuitgesproken), zoals het onderwerp en lijdend voorwerp. Uit hoofdstuk 13 blijkt, dat veel PI-kinderen moeite hebben met het cohesief verbinden van zinnen door middel van clausale ellipsis constructies, voegwoorden en het gebruik van duidelijke verwijstwoorden. Dit beïnvloedt de communicatie negatief.

In hoofdstuk 14 onderzoeken we het vermogen van PI-kinderen om een verhaal te vertellen dat is uitgelokt met het plaatjesboek van de Frog story. We analyseren in hoeverre de PI-kinderen in staat zijn om de onderling causaal samenhangende gebeurtenissen van het verhaal te verwoorden. Daarnaast hebben we ook in het narratieve genre gekeken naar het vermogen om duidelijk te verwijzen. Om dit goed te kunnen doen moeten kinderen (1) zich kunnen identifieren met de hoofdpersoon van het verhaal, (2) enig inzicht hebben in het menselijk handelen in zijn algemeenheid en (3) rekening kunnen houden met de behoefte van de luisteraar aan die informatie, die nodig is om het verhaal te kunnen begrijpen. Deze drie vaardigheden zijn onderdeel van de ontwikkeling van een Theory-of-Mind.

Uit onze analyse blijkt, dat de PI-kinderen meer moeite hebben de narratieve taak dan de N-kinderen. Ze beginnen regelmatig over eigen belevenissen naar aanleiding van de plaatjes. Verder hebben de PI-kinderen problemen om het begin van het verhaal in te bedden in een overkoepelende tijdslijn en ook hebben ze moeite met het verwoorden van de verschillende verhaalonderdelen. Vooral het expliciet verwoorden van de exacte locatie van verschillende zoekacties is moeilijk, alsook
van het hoogtepunt van het verhaal. De PI-kinderen blijken verder niet alleen significant meer moeite te hebben dan de N-kinderen met het introduceren van de personen/dieren die in het verhaal een rol spelen, maar ook met het verwijzen naar deze entiteiten met een (persoonlijk) voornaamwoord.
Het duidelijk en expliciet kunnen verhalen van causaal gerelateerde gebeurtenissen die anderen hebben meegemaakt in fantasieverhalen of in de wereld van alledag is essentieel voor het communiceren met anderen over anderen. Alleen zo kan zich bij kinderen een idee ontwikkelen over hoe mensen in elkaar zitten en hoe in onze wereld bepaalde gebeurtenissen samenhangen. Uit hoofdstuk 12 blijkt echter, dat veel PI-kinderen ernstige semantische/pragmatische problemen hebben met het verwoorden van causaliteit in het narratieve genre.
Alhoewel dit buiten ons onderzoeksterrein valt, leiden wij uit deze resultaten voorzichtig af dat de PI-kinderen waarschijnlijk moeite hebben om zich te identificeren met de hoofdpersoon van het verhaal, dat zij mogelijkerwijs een gering inzicht hebben in het menselijk handelen en waarschijnlijk moeite hebben om rekening te houden met de informatie behoefte van de luisteraar. De ernstige semantische/pragmatische problemen van PI-kinderen die uit het vertellen van de Frog story naar voren komen, kunnen wijzen op hiermee samenhangende problemen in de ontwikkeling van een Theory-of-Mind.


Ons onderzoek bevestigt de comorbiditeit van taalstoornissen in kinderen met psychische stoornissen: ten minste 82% van de PI-kinderen vertoont een taalstoornis op morfologisch/syntactisch gebied, hetgeen nog hoger zou zijn als de semantische/pragmatische problemen op een vergelijkbare wijze meegenomen zou kunnen worden. De micro-analyse van de spontane taal, zoals beschreven in de hoofdstukken 4 tot en met 14, toont aan, dat PI-kinderen een variatie aan morfologische/syntactische en semantische/pragmatische problemen hebben. In het laatste hoofdstuk 15 hebben wij onderzocht of er een relatie bestaat tussen specifieke MS- en SP-profielen van LI en specifieke typen van internaliserende en/of externaliserende PI. Met behulp van een factor-analyse zijn wij de aan elkaar
gerelateerde MS- en SP-variabelen, die een significant groepsverschil opleverden tussen de 120 PI-kinderen en de N-kinderen, vier taaldimensies opgesteld. Deze vier dimensies zijn:

- Dimensie I: een onvermogen om expliciet te zijn in een conversatie
- Dimensie II: een onvermogen om expliciet te zijn in een narratie
- Dimensie III: een onvermogen om relevant te zijn in beide genres
- Dimensie IV: een onvermogen in de responsiviteit in een conversatie

PI-kinderen die uitvallen op een of meer dimensies vormen de groep kinderen met een extreme LI op het gebied van de MS en SP. Deze 44 PI-kinderen hebben een gecombineerd MS- en SP-taalstoornisprofiel. De vier specifieke diagnostisch te onderscheiden groepen uit het totaal aantal van 44 PI-kinderen met een extreme LI, blijken significant te onderscheiden op deze vier taaldimensies, namelijk:

- 15% van de PI-kinderen met internaliserende stoornissen, zoals een Angststoornis of een Depressie, vertoont een extreme LI met abnormale scores op Dimensie III.
- 32% van de PI-kinderen met 'Geen Diagnose' vertoont een extreme LI, die niet getypeerd kan worden volgens één specifieke Dimensie. Deze PI-kinderen vallen alleen in een combinatie van Dimensies.
- 50% van de PI-kinderen met externaliserende stoornissen, zoals ADHD of Oppositionele Gedragsstoornis, vertoont een extreme LI gekenmerkt door abnormale scores op Dimensie III, gevolgd door abnormale scores op Dimensie I en II.
- 60% van de kinderen met PDD-NOS vertoont een extreme LI met abnormale scores op Dimensie III, gevolgd door abnormale scores op Dimensie I en II en een combinatie van I, II en III.

Concluderend kunnen we zeggen, dat een derde van de populatie PI-kinderen een extreme LI vertoont, waarbij MS- en SP-variabelen aan elkaar gerelateerd zijn. Veel PI-kinderen uit de resterende groep vertonen ook een MS en/of SP LI, die niet extreem van aard is.

Van alle specifieke types PI vertonen de PI-kinderen met een internaliserende stoornis, zoals een Angststoornis of een Depressie, een relatief minder erge taalstoornis op morfologisch/syntactisch en/of semantisch/pragmatisch gebied dan de PI-kinderen met een externaliserende stoornis, zoals ADHD. De PI-kinderen met PDD-NOS zijn het meest ernstig taalgestoord zowel op MS-gebied als op SP-gebied.

Het is belangrijk om te overwegen in hoeverre de aangetoonde taalstoornissen in de 120 PI-kinderen generaliseerbaar zijn buiten de onderzoekssetting. Wij hebben de indruk dat de taalstoornis zich ook duidelijk moet manifesteren, wanneer LIPI-kinderen psychiatrisch worden onderzocht en behandeld. De taalstoornis kan de psychiatrische stoornis negatief beïnvloeden, terwijl een behandeling van de taalstoornis een positieve invloed zou kunnen hebben op de symptomen van een PI...
door de meest negatieve effecten ervan weg te nemen. De negatieve consequenties van een taalstoornis zullen nog het meest in hun directe omgeving, op school en thuis, in het oog springen; een omgeving, waarin de LIPI-kinderen zich in een meer competitieve relatie bevinden met schoolvriendjes, broertjes en/of zusjes. Dit kan er toe leiden, dat de LIPI-kinderen veelvuldig een verstoring in de communicatie ervaren, die op haar beurt de PI in stand kan houden.

Wij hebben laten zien hoe ernstig en uiteenlopend de taalstoornissen van kinderen met een psychiatrische stoornis kunnen zijn. Wij hopen dat iedereen die beroepsmatig of anderszins met deze kinderen te maken heeft, rekening zal houden met dit gegeven, zodat deze kinderen in de toekomst beter kunnen worden gediagnosticeerd, behandeld en begeleid in hun tweevoudige handicap.
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Curriculum Vitae

Claudia Blankenstijn

Claudia Blankenstijn was born in 1963 in Leiden. She obtained the Gymnasium Gamma (+ Mathematics) certificate at the Stedelijk Gymnasium in 1982. In 1986 she finished her Bachelors as speech/language therapist in Utrecht with a thesis about a specific form of language therapy that includes goals for morphological/syntactic and semantic/pragmatic improvement in young LI-children.

In 1987 she studied at the University of Leiden Dutch Language and Literature. In 1988 she started at the University of Amsterdam with General Linguistics. In the mean while she worked at different schools as a speech/language therapist with normally developing and language impaired children and opened her own clinic for speech and language disordered children in Leiden. In 1989 she also worked one year as a teacher in Language Development and Pathology at the Leidse Hogeschool, teaching speech/language therapist students. She was an active member of the Werkverband Amsterdamse Psycholinguisten (WAP), organising a congress about Language Ability in 1991, together with Annette Scheper and others. In 1992 she obtained her doctorate with an MA thesis on language development in hearing children with deaf parents, written together with Beppie van den Bogaerde.

In 1993 she started together with Annette Scheper on the project concerning 'Language development in children with psychiatric impairment'. Since language analysis and family life are time consuming, she had to close her private clinic for Speech/ Language disordered children in 1996. In the years that followed, she only incidentally worked as a language therapist with severe language disordered children. In 2001 she published together with Prof. Dr. Anne Baker and Dr. M. Roelofs two articles concerning pragmatic development in normally developing Dutch-speaking children.
Curriculum Vitae

Annette Scheper

Annette Scheper was born on January 18 in 1962 in Hengelo. She attended the Elshof College in Nijmegen, where she received her Gymnasium Beta (only with mathematics) certificate in 1981. In 1985 she received her certificate for the education of Logopedics and Foniatics in Hoensbroeck with a thesis about oral-motoric training for young children with fluency disorders; she developed a test instrument and a treatment procedure together with Gaby Rookus and Carla Reijners. From 1986 to 1997 she carried out her own language diagnostic and treatment centre within the Netherlands Institute for Sensoric Integration (NCSI) in Haarlem. As a language therapist and certified sensoric integration therapist, she provided direct language assessment to children with language disorders, especially children with ADHD and children with Autistic Spectrum Disorder, in a multidisciplinary team.

She entered the University of Amsterdam in 1986, starting on General Linguistics in 1987 with the focus on first language acquisition and language (developmental) disorders. She was an active member of the Werkverband Amsterdamse Psycholinguisten (WAP), organising a congress about Language Ability in 1991, together with Claudia Blankenstijn and others. In 1992 she obtained her doctorate with an MA thesis on 'Language disorders in patients with Alzheimer disease' together with Paul van der Voort. During her scientific study she also worked at a clinic for child and youth psychiatry in Oegstgeest together with Claudia Blankenstijn to explore language assessment tools in order to describe language abilities of children with a psychiatric impairment. In 1993, she started a doctorate research on the language development of children with psychiatric impairment together with Claudia Blankenstijn, which resulted in this thesis. She published different articles with Prof. Dr. Anne Baker concerning morphological/syntactic development in Dutch-speaking children with psychiatric impairment during the past years.

Currently, she starts with the funding of a project 'Language disorders in children with ADHD' within a large-scale project of the genetic basis of ADHD on the University Medical Center of Utrecht (UMCU) together with Claudia Blankenstijn.