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Blankenstijn, C.; Scheper, A.R.

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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 in morphemes (MLUm) 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 as predictor 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 mazes², 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 $MLU_w$ is computed by counting all the communicatively used words in the conversational interview divided by 50 (Example 1).

Example 1  

$MLU_w$ (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 $MLU_w$ is 7 and the words used non-communicatively are 3. Similarly, the $MLUL_w$ is computed by counting all the communicatively used words in the 5 longest T-units divided by 5. Since no data of $MLU_w$ and $MLUL_w$ 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: $MLU_w$ and $MLUL_w$

From Table 8.1 (first column) it is obvious that not a significantly high number of PI-children show severe problems with $MLU_w$. 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 $MLU_w$ ($p<.000$)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 $MLU_w$. 65% of the PI-children show no problems with $MLU_w$. The PI-children that have no or slight problems according to their $MLU_w$ 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-fluenices are called 'non-communicatively' used words.

³ Binomial test was used in PI-children to measure the differentiation in severe problems ($z \leq -2$) and slight problems ($-2 < z \leq -1$) on the variable $MLU_w$ according to the STAP-values (Van den Dungen and Verbeek, 1994, 1999).
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>z-scores</th>
<th>$MLU_w$</th>
<th>$MLUL_w$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$z \leq -2$</td>
<td>$-2 &lt; z \leq -1$</td>
</tr>
<tr>
<td></td>
<td>2,3%</td>
<td>16%</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td></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</td>
<td>3</td>
<td>3%</td>
</tr>
</tbody>
</table>

From Figure 8.1 (Appendix 8a)\(^4\) 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 ($F(5, 114)=35.441; p<.000; Eta squared .30; R squared .22$).\(^5\)

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 MLULw, 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<.0006), 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 MLULw compared to N-children. The development with age related to MLULw is shown in Figure 8.2 (and Appendix 8bf).

As can be seen from Figure 8.2, the MLULw 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 MLUw and MLULw in PI-children: the subgroup of PI-children with a relatively high MLUw also has a relatively high MLULw and vice versa (p<.000).

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5 One-way ANOVA with MLUw 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 MLULw according to the STAP-values (Van den Dungen and Verbeek, 1994, 1999).

7 The variable MLULw 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 MLULw 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 MLUw and MLULw (related to 50 T-units) in 120 PI-children.
8.2.3 Conclusion: MLU\textsubscript{w} and MLUL\textsubscript{w}
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 MLU\textsubscript{w} and MLUL\textsubscript{w} 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 MLU\textsubscript{w} and MLUL\textsubscript{w}. 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 adverbs\textsuperscript{10}, 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

\textsuperscript{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**

Correctly formed clausal ellipsis (PI-child; age 4:10)

<table>
<thead>
<tr>
<th>Interviewer:</th>
<th>Rudy:</th>
<th>Paraphrasis:</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>hen, vertel eens heb jij broertjes of zusjes?</em></td>
<td>#1 een broertje.</td>
<td>[ik heb] een broertje.</td>
</tr>
<tr>
<td><em>hi, tell me do you have brothers or sisters?</em></td>
<td>#1-a-younger-brother.</td>
<td>[i-have]-a-younger-brother.</td>
</tr>
<tr>
<td></td>
<td>(hi, tell me do you have brothers or sisters?)</td>
<td>(I have a younger brother).</td>
</tr>
</tbody>
</table>

\(^{11}\) 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).

\(^{12}\) Clausal ellipsis constructions that exist of single 'yes' and 'no' are not counted in the analysis (Van den Dungen and Verbeek, 1994, 1999:15).

\(^{13}\) 'he' in sentence-initial position in Dutch is a so-called 'attention-getter' to introduce a new topic (Haijkens, 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?
#2 and-live-you-in-a-new-house-or-not?
(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 have-you-also-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.
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>
</tbody>
</table>
| Nominal phrase                       | Heb jij huisdieren? Ja, ik heb ∅* / Ja, ∅ heb ik  
(Do you have pets? Yes, I have ∅ /Yes, ∅ have I) |
| Verbal phrase                        | Heb jij broertjes of zusjes? Ik ∅ een broertje  
(Do you have brothers or sisters? I ∅ a brother) |
| Prepositional phrase                 | Wonen jullie in een nieuw huis? Nee, ∅ ∅ ∅ een oud huis  
(Do you live in a new house? No, ∅ ∅ ∅ an old house) |
| Adverbial phrase                     | Woon jij in een huis? Ja, ik woon ∅  
(Do you live in a house? Yes, I live ∅) |
| **Functional categories**            |                                               |
| Determiner (article)                 | Heb jij broertjes of zusjes? ∅ broertje  
(Do you have brothers or sisters? ∅ brother) |

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 Binominal test was used in PI-children to measure the differentiation in severe problems ($z \leq -2$) and slight problems ($-2 < z \leq -1$) on the variable Total number of forms with clausal Ellipsis according to the STAP-values (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</th>
<th>z ≤ -2 25%</th>
<th>-2 &lt; z ≤ -1 16%</th>
<th>z &gt; -1 81.7%</th>
</tr>
</thead>
<tbody>
<tr>
<td>4yrs</td>
<td>0%</td>
<td>0%</td>
<td>20%</td>
</tr>
<tr>
<td>5yrs</td>
<td>0%</td>
<td>0%</td>
<td>20%</td>
</tr>
<tr>
<td>6yrs</td>
<td>1%</td>
<td>5%</td>
<td>15%</td>
</tr>
<tr>
<td>7yrs</td>
<td>0%</td>
<td>0%</td>
<td>20%</td>
</tr>
<tr>
<td>8yrs</td>
<td>0%</td>
<td>2%</td>
<td>18%</td>
</tr>
<tr>
<td>9yrs</td>
<td>0%</td>
<td>1%</td>
<td>19%</td>
</tr>
<tr>
<td>Total PI-children/%</td>
<td>1%</td>
<td>7%</td>
<td>112%</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.
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>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</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>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</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<0.006; Eta squared .08; R squared .06) (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.
Paraphrase20: 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.
and he 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 paraphrase 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-come-now-and-I-Ø-tomorrow.

**Paraphrasis:**

Jullie komen meteen en ik [kom] morgen  
You-come-now-and-I-[come]-tomorrow.

(You (plural) are coming now and I (singular) Ø tomorrow)

(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-unit (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-go-I-with Frank-also-outside-play-Ø-with Daniel-also.  
(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-go-I-with Frank-outside-play<and>-with-Daniel-also.
(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 22 (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</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=45</td>
<td>n=60</td>
</tr>
<tr>
<td>Total forms</td>
<td>x</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>x</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) 23 (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

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.

the N- and the PI-children. No significant age or interaction effect is found between the two groups of children.
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* that ship almost fell over)

**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 I do stroke her)

Paraphrase:  want als ik wel eens ziek <ben> dan ga ik haar aaien.

(so if I sometimes ill <am> 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

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24 ANOVA with Subordinations in general as dependent variable and age (4-6-8yrs) as independent variable is used in the N- and 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>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>3.27</td>
<td>6.5%</td>
</tr>
<tr>
<td>5yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6yrs</td>
<td>6.20</td>
<td>12.4%</td>
</tr>
<tr>
<td>7yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8yrs</td>
<td>4.60</td>
<td>9.2%</td>
</tr>
<tr>
<td>9yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>4.69</td>
<td>9.4%</td>
</tr>
<tr>
<td>Correctly formed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4yrs</td>
<td>2.80</td>
<td>85.6%</td>
</tr>
<tr>
<td>5yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6yrs</td>
<td>5.27</td>
<td>85.0%</td>
</tr>
<tr>
<td>7yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8yrs</td>
<td>3.67</td>
<td>79.8%</td>
</tr>
<tr>
<td>9yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>3.91</td>
<td>86.4%</td>
</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.

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\(^{25}\) 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.

![Figure 8.5](image)

**Figure 8.5** Percentage of correctly formed embedded clauses (related to the total number of embedded clauses) in 45 N-children and 120 PI-children in the conversational genre

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

\(^{26}\) 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.
The general picture is as follows:

\[
\begin{align*}
\text{Thematic (semantic) relations (e.g. agent)} \\
\text{Argument structure (external argument)} \\
\text{Syntactic relations (e.g. subject)}
\end{align*}
\]

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-children29 (Figure 8.6; Appendix 8d).

Figure 8.6 Development with age of the number of obligatory object verbs (related to T-units with a realized verb) in 45 N-children and 120 PI-children in the conversational genre

---

29 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 (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)

*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. 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.

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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 \((F(6,105)=9.357; \ p<.003)\)\(^{32}\), 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\(_w\) and MLUL\(_w\) 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\(_w\) and MLUL\(_w\) counts. We conclude that PI-children only differ from N-children in the production of copula verbs with an objectless verb frame.

---

\(^{32}\) 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 ($F(3,153)=3.344;\ p<.021)^{33}$, mainly caused by the difference in the use of copula verbs.

Figure 8.10  Development with age of all the different verb forms in 45 N-children and 120 PI-children in the conversational genre

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%).

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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 schrijft de brief af' (he writes the letter out). When the particle 'af' is not present, the activity may be ongoing. By using the particle 'af', 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

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\(^{34}\) "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 aspectual 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 explicaded 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 PPs. 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 Scheper (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 lang* 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.
(once my grandmother had also eaten two)

Paraphrase:  
toen had mijn oma ook eens een keer (twee) twee opgegeten.
(once my grandmother had also eaten two of them)

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:  
je hebt heleboel prikpennen [punaises] op het derde bord.
(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-children\(^{36}\). 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).

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\(^{35}\) 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

<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)\(^{37}\) (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 8.12

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\(^{38}\). The

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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).

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

semantic 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>
<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><strong>Connectivity</strong></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><strong>Transitivity</strong></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.