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

Citation for published version (APA):

General rights
It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations
If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: http://uba.uva.nl/en/contact, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.

UvA-DARE is a service provided by the library of the University of Amsterdam (http://dare.uva.nl)
5 The ability to realize lexical categories: lexical verbs, verbal arguments, prepositions and adverbials

Annette Scheper

5.1 Introduction

As mentioned in Chapter 4, linguistics divides morphological/syntactic categories into lexical and functional categories. Lexical categories, like verbs, nouns, adjectives and prepositions are distinguished from functional categories, like inflection morphemes, auxiliaries, copula verbs and determiners. Lexical categories undergo functional adjustments that determine the syntactic structure. Children have to acquire lexical categories and a set of functional projections to construct the grammar of their specific language (e.g. Clahsen 1989; Chomsky, 1992).

A large subgroup of SLI-children shows grammatical disorder in contrast to subgroups that have exclusively phonological or semantic-pragmatic disorders (Clahsen, 1989; Beers, 1995; Fletcher and Ingham, 1995; De Jong, 1999). Attention was first focussed on the problems with functional categories in English and German (Leonard, 1989; Clahsen, 1989, 1990; Gopnik, 1990; Grela and Leonard, 2000). Grammatical morphemes are frequently omitted in an obligatory context or substituted. Second, problems with verb argument structure have been identified in English (King and Fletcher, 1993) and Dutch SLI-children (De Jong, 1999). Argument drop appears to be a universal phenomenon in linguistic development and occurs in different languages (Haegeman, 1991), but in SLI-children omission of an argument results too often in ungrammaticality and continues for a long time.

A pilotstudy in 18 Dutch-speaking PI-children showed similar problems in realizing lexical categories, i.e. realizing the verb and it's arguments compared to SLI-children, but no incorrect use of functional categories was observed (Mills and Tso, 1991). Like SLI-children, PI-children seem to have problems in identifying the obligatory syntactic categories to constitute a proper grammatical sentence. The goal of this section2 is to examine whether lexical categories constitute a problem for PI-children and thus contribute to the ungrammaticality found in Chapter 4.

The different lexical categories involved are lexical verb (5.2), argument structure – specifically the subject (5.3) and the direct object (5.4) and the distribution of subjects and objects (5.5) – prepositions (5.6) and adverbials (5.7). To gain a better insight in the (un)grammatical form of the different lexical categories, we

---

1 For an overview of linguistic explanations of grammatical SLI we refer to De Jong (1999:21).
2 A handbook for the analysis of lexical categories has been developed (Scheper, 1996).
distinguish two error types:\footnote{Errors of omission are particularly problematic since it is possible that the child knows that they are not acceptable, but because of performance limitations, the child is unable to produce all of the constituents he knows that are required (Stromswold, 1996:33).} missing lexical categories, where an obligatory element is omitted in the T-unit and errors in lexical categories, where an element that is present in the T-unit is used incorrectly. The type of ungrammaticality has a varying impact on the understanding of the message. The missing lexical categories are discussed in this chapter and the errors in lexical categories in Chapter 6. The results with respect to the missing lexical categories in 120 PI-children are compared to those in 45 N-children from the Roelofs-population aged four, six and eight years (Roelofs, 1998)\footnote{In the analysis of missing lexical categories N-children from the Roelofs-population (1998) are included, because the STAP (Van den Dungen and Verbeek, 1994, 1999) does not use all the missing categories as defined in this section.}.

5.2 Missing Lexical Verbs

5.2.1 Research questions, definitions and operationalisations

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

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

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

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

Interviewer: Wat deed je toen? (what did you do then?)
Rick: Zo grote Θ tot op de grond. Such-large-Θ down-to-the-ground.
(I found such a large one [stick] from here down to the ground)

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

Rick: En toen had ik Kinderen voor Kinderen<6> Θ. And-then-eh-I-had Children-for-Children-Θ. (And then eh I had Θ for Children for Children)
Paraphrasis: En toen had ik Kinderen voor Kinderen <geluisterd>. And-then-had-I-Children-for-Children<listened>. (And then I had listened to Children for Children)

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

---

5 Θ means an unexpressed linguistic category.
6 Children for Children is a proper name, namely the name of a Dutch children's choir.
7 Several linguists claim that spontaneous language utterances with direct voice constructions have an autonomous character without an explicit main clause.
**Example 3**  
**Direct voice construction with a missing main clause in Dutch (PI-child; age 8;2)**  
(Conversational topic: according to the PI-child, the pet animal is scared about the way in which he is lifted by the sister of the PI-child)

Tanja:

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

Paraphrasis:

<ik zei> "want daar wordt dat beestje bang van".  
<I said> "because therefore is that animal [+little]-scared-for".  
(<I said> "because it will scare that little animal")

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

### 5.2.2 Results: Missing Lexical Verbs

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

**Table 5.1** Mean total number of T-units used in the analysis of missing lexical verbs and mean total number, percentage (related to 50 T-units minus copula verbs) and standard deviation missing lexical verbs in 45 N-children and 120 PI-children

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

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

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

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

### 5.2.3 Conclusion: Missing Lexical Verbs

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

### 5.3 Missing Subjects

#### 5.3.1 Research questions, definitions and operationalisations

When learning to produce verbs, children also have to learn which obligatory arguments, a subject, object or other type of argument, a verb requires (e.g. Chomsky, 1981; Pinker, 1984). A sentence is considered to be grammatical only if the arguments specified as obligatory by the verb's argument structure are actually present as constituents in the sentence (Chomsky, 1981). The information as to the semantic relationship between the predicate and its arguments is part of the lexical knowledge of the native speaker and should also be recorded in the lexicon. The types of arguments that a verb takes are specified by the semantic functions of the arguments: Agent, Goal, Recipient, etc. (e.g. Haegeman, 1991). There is agreement that subjects and objects are equal to some extent: they are arguments of the verb
The most obvious difference between them is obligatoriness. Subjects are obligatory in each sentence of every language, whether these subjects are phonetically empty or not (Chomsky, 1981). Chomsky specified this requirement in his Extended Projection Principle. Languages with phonetically non realized subjects, like Italian and Spanish, are called 'null-subject languages'. Dutch is not a null-subject language, so every Dutch sentence principally requires an overt subject.

Since Dutch is also a topic drop language (Jansen, 1981; Weerman, 1989), only certain pragmatic conditions can motivate a missing subject and object in Dutch, which will not lead to ungrammaticality. The phenomenon of dropping arguments, a subject or an object, in topic position is called discourse topic drop and functions as a discourse-organising strategy to establish cohesion and coherency in normal spoken Dutch (De Haan and Tuijnman, 1988). The expectation on the basis of developmental research is that normally developing children have to learn the specific conditions that allow the use of missing subjects as cases of discourse topic drop. This is an indicator of good language capacities. But also a decrease in the number of missing subjects in general, which causes ungrammaticality, is expected (see also Thrift, 2003).

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

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

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

We will show whether the PI-children show less complex morphological/syntactic abilities than the N-children and whether they make more morphological/syntactic errors than N-children. The number of discourse topic drop will be clear from the number of ungrammatical missing subjects.

We want to answer the following question: is the mean total number of grammatical and ungrammatical missing subjects in interviews with PI-children comparable to the average amount in interviews with N-children? And, is there a comparable development with age?
The ability to realize lexical categories

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

Example 4

<table>
<thead>
<tr>
<th>T-unit</th>
<th>Paraphrase</th>
</tr>
</thead>
<tbody>
<tr>
<td>En 0 ruim het graks toch weer op. And-0-clean-this-later-again-up. (And 0 clean it up later)</td>
<td>En &lt;i&gt;ik&gt; ruim het straks toch weer op. And&lt;i&gt;-clean-this-later-again-up. (And &lt;i&gt; clean it up later)</td>
</tr>
</tbody>
</table>

A missing subject is only licensed under two conditions. The first condition requires that the argument to be dropped is in the topicalized position, i.e. initial position in the sentence. Topicalization is only possible if a preposed finite verb is present. In this analysis we call this the place condition. The second condition concerns the correct referential relation of the dropped argument. The referent of the dropped argument must be recoverable from the preceding utterance. In the analysis under investigation we call this the reference condition. Only when these two conditions are fulfilled, can we code a grammatical missing subject; when these conditions are not fulfilled, we code an ungrammatical missing subject (Figure 5.2).
We are only interested in the cases of missing subjects (marked Bold in Figure 5.2), so type 1 is not relevant here. Type 2 is a missing subject in topic position (place condition), which is referentially (reference condition) clear and the result is a grammatical missing subject (i.e. discourse topic drop). Only missing subjects as in type 2 establish appropriate coherence and cohesion in the interview and illustrate good language skills (see for more details 12.4 to 12.7 and 13.5 to 13.7). Types 3 and 4 always result in ungrammaticality. Missing subjects in topic position but referentially unclear (type 3) are judged as ungrammatical, because they do fulfil the place condition, but not the reference condition. Finally, missing subjects in non-topic position (type 4) are always judged as ungrammatical, because even the place condition is not fulfilled. The analysis of missing subjects includes the grammatical forms (type 2) and the ungrammatical forms (types 3 and 4).

---

10 The STAP-instrument (Van den Dungen and Verbeek, 1994:24, 1999) judges all missing subjects in initial position as ungrammatical without verifying the referential relation. A more differentiated approach with respect to the reference condition is necessary to judge whether a missing subject in initial position is grammatical or not (De Haan and Tuijnman, 1988).
The ability to realize lexical categories

First, an illustration of a grammatical missing subject in first position and referentially appropriate (type 2) is given in Example 5.

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

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

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

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

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

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

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

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

Rudy:~  
Ø weet ook niet, waar ik woon.  
Ø doesn't know either where I live.  
(Ø doesn't know either where I live).

Paraphrasis:  
<ik/Zij?> weet ook niet, waar ik woon.  
<She doesn't know either where I live.  
(<She> doesn't know either <Ø/s> where I live).

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

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

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

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

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

We established the number of missing subjects in topic position, i.e. that fulfilled the place condition (Appendix 5b). Across the board N-children leave the preposed subject more frequently unexpressed than the PI-children, but no significant group and group*age interaction effects were found, only a significant age effect for both populations (F(2,98)=3.385; p<.038)\textsuperscript{12}. In N-children the significant age effect (F(2,45)= 4.337; p<.019)\textsuperscript{13} can be fully explained as a linear trend (p<.023; Eta squared .17\textsuperscript{14}; R squared .11) and indicates a linear decrease between the youngest N-children and the oldest ones. However, in PI-children the significant age effect (F(5,114)= 3.490; p<.006)\textsuperscript{15} cannot be explained in terms of linearity. To sum up, the N-children show a linear decrease with age in leaving the subject in first position unexpressed in contrast to the PI-children.

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

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

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

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

\textsuperscript{14} For explanation of statistics see footnote 9 in section 5.2.

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

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

<table>
<thead>
<tr>
<th>Grammatical Missing Subjects</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>Place and Reference condition fulfilled:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>0.53</td>
<td>35%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.20</td>
<td>43%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.20</td>
<td>33%</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.31</td>
<td>36%</td>
</tr>
</tbody>
</table>

The percentages of grammatical missing subjects in N-children is higher than in PI-children, but surprisingly, there are no significant main effects for group, age or group*age interaction found16. Differences between age groups can also be seen in Figure 5.3.

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

Despite the clear difference found in the youngest PI and N-children, the small differences found in the six and eight-year-olds probably canal out a significant

16 ANCOVA with Grammatical missing subjects as dependent variable, Topicalized missing subjects as covariate and group (N-PI) and age (4-6-8yrs) as independent variables.
main effect for group. We can therefore conclude that the PI-children and N-children have a comparable number of missing subjects as cases of discourse topic drop, despite the different behaviour in the youngest N and PI-children. Contrary to our expectations, PI-children use this discourse-organizing strategy as much as N-children, which illustrates good language skills17.

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

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

<table>
<thead>
<tr>
<th>Ungrammatical Missing Subjects</th>
<th>N-children  n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x % sd</td>
<td>x % sd</td>
</tr>
<tr>
<td>4 yrs</td>
<td>1.27 3% 1.16</td>
<td>3.45 8% 3.36</td>
</tr>
<tr>
<td>5 yrs</td>
<td>- - -</td>
<td>1.05 2% 1.28</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.33 1% 0.49</td>
<td>1.95 4% 2.42</td>
</tr>
<tr>
<td>7 yrs</td>
<td>- - -</td>
<td>0.75 2% 1.02</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.40 1% 0.83</td>
<td>1.90 4% 2.45</td>
</tr>
<tr>
<td>9 yrs</td>
<td>- - -</td>
<td>1.65 3% 1.60</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.67 2% 0.95</td>
<td>1.79 4% 2.30</td>
</tr>
</tbody>
</table>

Figure 5.4 shows the percentage ungrammatical missing subjects with age in both populations. Furthermore, the distribution of the categories ungrammatical type 3 and ungrammatical type 4 missing subjects is comparable in the two populations19.

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

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

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

5.3.3 Conclusion: Missing Subjects

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

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

5.4 Missing Objects

5.4.1 Research questions, definitions and operationalisations

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

For example, the Dutch verb 'maken' (to fix) is an obligatory transitive verb that takes a direct object (Haeseryn et al., 1997:50), as the scene to which it refers to in real life triggers the explicitation of the entity that is 'fixed' (Example 8).

Example 8 Obligatory transitive verb in Dutch: maken

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

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

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

**Example 9** Optional transitive verb in Dutch: eten

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

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

**Example 10** Obligatory ditransitive verb in Dutch: geven

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

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

**Example 11** Intransitive verb in Dutch: zitten

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

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

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

The analysis of missing objects is based on the distinction between obligatory and optional objects with a transitive verb (Pinker, 1989), although this boundary is often unclear. Thompson and Hopper (1997) state that nearly all obligatory transitive verbs have a context available in conversation in which no expression of the obligatory argument is necessary. They relate the argument structure of verbs to the frequency of verbs in conversation. Highly frequent verbs have a less tight argument structure than low frequency verbs. Thus, highly frequent verbs more often permit an optional object, whereas low frequency verbs more often need the explicitation of an object, therefore called an obligatory object (Thompson and Hopper, 1997). Although this idea of putting verbs on a scale of object obligatoriness is quite attractive, other aspects seem even more important, such as the semantic loading of verbs in relation to the scenes to which these verbs refer, resulting in more than one type of argument structure with a specific verb (i.e. argument structure alternation).

For example, the verb 'breken' (to break) can have a transitive (causative) structure with an internal and external argument (e.g. Tom is breaking the glass), and an intransitive structure with an internal argument, resulting in a change of location or state (e.g. the glass breaks). Children have to learn this intrinsic loading of verbs and store this verb frame information in their lexicon (e.g. Pinker, 1989; Wijnen and Verrips, 1998).

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

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

Tijn drinkt.
Tijn-drinks.
(Tijn drinks)

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

Example 13  Optional transitive verb without an optional object in Dutch

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

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

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

*Tijn maakt 0
Tijn-fxes-0
(Tijn fixes 0)
*Tijn maakt altijd 0.
Tijn-fxes-always-0.
(Tijn fixes always 0)

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

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

Andre:  *#1 Maar ik had een keer 0 op teevee gezien.
#1 But-I-had-once-0-on-TV-seen.
(#1 But I had seen 0 once on TV).
Paraphrasis:  Maar ik had een keer <de pinguins> op TV gezien.
But-I-had-once-<the penguins>-on-TV-seen.
(But I had seen <the penguins> once on TV).

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

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

---

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

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

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

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

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

Wendy:

Paraphrasis:

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

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

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

The topic of conversation is playing with other children

Interviewer:

Mandy:

Paraphrasis:

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

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

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

Gerrit:

Paraphrasis:

Example 18
5.4.2 Results: Missing Objects
We checked whether in 60 PI-children and 45 N-children the number of verbs that take an obligatory object was comparable. This proved not to be the case: the N-children produced significantly more of this type of verb in 50 T-units (F(1,99)=6.193; p<.014) (see Appendix 5c). Therefore the number of obligatory object verbs serves as covariate to evaluate the total number of missing obligatory direct objects.

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

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

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

---

24 The production of obligatory object verbs will also be discussed in more detail in Chapter 8, which presents the complexity of lexical categories, especially lexical verbs.
25 ANOVA with Obligatory object verbs in 50 T-units as dependent variable and group (N-PI) and age (4-6-8yrs) as independent variables.
26 ANCOVA with Missing objects as dependent variable, Obligatory object verbs in 50 T-units as covariate and group (N-PI) and age (4-6-8yrs) as independent variables. The interaction-effect was not significant.
27 ANCOVA with Topicalized missing objects as dependent variable, Total number of missing objects as covariate and group (N-PI) and age (4-6-8yrs) as independent variables.
28 ANCOVA with Grammatical missing objects as dependent variable, Topicalized missing objects as covariate and group (N-PI) and age (4-6-8yrs) as independent variables. No significant age and group*age interaction effect were found.
What is more, if the PI-children make appropriate grammatical topicalized missing objects, they do this in rather stereotypical and simple utterances, for example: Ø weet ik niet (I do not know Ø), in which the preposed pronoun 'dat' (that) is not realized. This preposed null pronoun always referred to the preceding question of the interviewer and was interpreted as referentially appropriate. Some children had quite a large number of these stereotypical answers, which influences the number of grammatical missing objects positively. These types of grammatical missing object do not reflect good language skills, however.

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

<table>
<thead>
<tr>
<th>Grammatical Missing Objects</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=45</td>
<td>n=120</td>
</tr>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>Place/Reference condition fulfilled:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>2.07</td>
<td>62%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.73</td>
<td>65%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.47</td>
<td>51%</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>1.09</td>
<td>61%</td>
</tr>
</tbody>
</table>

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

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

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

<table>
<thead>
<tr>
<th>Ungrammatical Missing Objects</th>
<th>N-children N=45</th>
<th>PI-children N=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>%</td>
</tr>
<tr>
<td>Obligatory object verbs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>20.47</td>
<td>41%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6 yrs</td>
<td>21.35</td>
<td>43%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8 yrs</td>
<td>20.87</td>
<td>42%</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>20.90</td>
<td>42%</td>
</tr>
<tr>
<td>Ungrammatical missing objects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>1.13</td>
<td>5%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.47</td>
<td>2%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.47</td>
<td>2%</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.69</td>
<td>3%</td>
</tr>
</tbody>
</table>

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

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

\(^{31}\) One-way ANOVA with Ungrammatical missing objects (related to total number of obligatory object verbs in 50 T-units) as dependent variable and age (4-5-6-7-8-9yrs) as independent variable in PI-children.
It is obvious that PI-children are not comparable to N-children with regard to the number of the ungrammatical missing objects in initial and non-initial position. The evidence from the results supports the idea that N-children with age know better which verb frame triggers an obligatory object than PI-children. The results do show some development with regard to expressing an obligatory object in PI-children between four and nine years of age, although it does not run parallel to normal development (Figure 5.7).

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

We will pay special attention to the post-verbal missing direct objects that contribute unconditionally to ungrammaticality (5.4.1). In Table 5.6 we see that the PI-children have significantly more post-verbal missing objects than the N-children (F(1,98)=5.133; p<.026).32

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

<table>
<thead>
<tr>
<th>Ungrammatical post-verbal missing objects</th>
<th>N-children n=45</th>
<th>PI-children n=60</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x % sd</td>
<td>x % sd</td>
</tr>
<tr>
<td>4 yrs</td>
<td>0.93 4.27% 1.03</td>
<td>1.25 9.39% 1.21</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.40 1.56% 0.63</td>
<td>0.75 3.44% 0.79</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0.40 1.86% 0.51</td>
<td>0.70 3.75% 1.26</td>
</tr>
<tr>
<td>Total mean</td>
<td>0.58 2.56% 0.78</td>
<td>0.90 5.53% 1.12</td>
</tr>
</tbody>
</table>

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

Figure 5.8  
Development with age of percentage ungrammatical post-verbal missing objects (related to total number of obligatory object verbs) in 45 N-children and 60 PI-children

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure5.8.png}
\caption{Development with age of percentage ungrammatical post-verbal missing objects (related to total number of obligatory object verbs) in 45 N-children and 60 PI-children}
\end{figure}

5.4.3 Conclusion: Missing Objects

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

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

\textsuperscript{34} One-way ANOVA with Post-verbal missing objects as dependent variable, Obligatory object verbs in 50 T-units as covariate and age (4-5-6-7-8-9yrs) as independent variable in PI-children.
The ability to realize lexical categories may also be related to the problems on the level of pragmatic function, i.e. establishing coreferential relations (see 13.5 to 13.7).

Krämer (1995) and Bol (1996) observed an asymmetry between missing subjects and objects in their Dutch data. These results contradict those of De Haan and Tuijnman (1988), who postulate that Dutch as a topic drop language shows no subject/object asymmetry, as is recently confirmed by Thrift (2003). Therefore, we checked if there is such an asymmetry between missing subjects and missing objects in the PI-children compared to the N-children. We present the results in the next section.

5.5 The distribution of Ungrammatical Missing Subjects and Objects

5.5.1 Research questions, definitions and operationalisations

From the literature (e.g. Hyams and Wexler, 1993; Hyams, 1994) a larger number of missing subjects than objects might be expected in English. Subjects tend to more often represent given information whereas objects tend to represent new information (Allen, 1998).

Unlike Hyams (1994), Krämer (1995) and Bol (1996) found for young Dutch normally developing children in the age range from 1;7 to 3;7 years a significant asymmetry between missing subjects and objects in favour of objects, also observed in German-speaking children (Boser, 1992). In topic drop languages normally developing children drop more objects then subjects in obligatory contexts (Weerman, 1989). These results could imply that normally developing children have to determine which information is given and which information is new in relationship to grammar. Children have to learn that only old information is redundant and new information has to be explicited (Allen, 1998). However, the opposite is found by Thrift (2003) in Dutch children (aged 1;8 to 3;1) in which the rates of subject drop did not differ substantially from the rates of object drop.

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

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

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

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

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

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

---

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

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

<table>
<thead>
<tr>
<th>Pearson’s correlation coefficient</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>value</td>
<td>sign.</td>
</tr>
<tr>
<td>4yrs</td>
<td>-.009</td>
<td>0.490</td>
</tr>
<tr>
<td>5yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6yrs</td>
<td>-.001</td>
<td>0.500</td>
</tr>
<tr>
<td>7yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8yrs</td>
<td>.414</td>
<td>0.060</td>
</tr>
<tr>
<td>9yrs</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Total mean .234 0.061 .452** 0.000

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

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

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

5.6 Missing Prepositions

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

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

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

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

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

To determine the rate at which prepositions are missing, the total number of prepositional phrases (PP) in 50 T-units are used, including the grammatical and the ungrammatical PP forms. More than one PP can occur in one T-unit. In Example 19
The ability to realize lexical categories

A missing preposition is shown in a PP, which marks an adverbial relation between an event and the circumstances of its occurrence, namely the place of the event.

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

Richie:  
Josy slaapt ∅ ze eigen kamer.
Josy-sleeps ∅ his-own-room.
(Joey sleeps ∅ his own room).

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

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

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

Richie:  
Ik heb plastikke schildpadden.
I-have-plastic-turtles.
(I have plastic turtles).

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

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

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

### 5.6.2 Results: Missing Prepositions

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

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

\textbf{Table 5.9}  \hspace{1cm} Mean total number and standard deviation \textit{realized prepositional phrases (PP)} (in 50 T-units) and mean total number, percentage (related to mean total number of realized prepositional phrases) and standard deviation \textit{missing prepositions} in 45 N-children and 60 PI-children

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

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

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

\textsuperscript{38} ANOVA with total number of missing prepositions as dependent variable and age (4-6-8yrs) as independent variable is used in the N- and PI-children. No significant age and group*age interaction effect were found.
The ability to realize lexical categories

5.6.3 Conclusion: Missing Prepositions
The number of PP's realized is comparable in the N and PI-children, and in most cases the N-children (97%) and PI-children (94%) realize an obligatory preposition within a PP. Although these results suggest that PI-children are capable of producing PP's, using these types of phrase structures to mark case relations between the predicate and its associated nominals or adverbial relations, we signalled significantly more missing prepositions within a PP in PI-children compared to N-children. This will contribute towards making the messages of PI-children unintelligible.

5.7 Missing Adverbials

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

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

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

Next, normally developing children from age two first have to learn to provide
spatial and temporal information inside the clause frame, before they can use more
integrated spatial and temporal information between clauses. From the age of 2;0
years children use clause-internal spatial information. The usage is at first quite
limited to certain lexical forms that adverbials take (Bamberg, 1994).
The first marking of temporal notions in children’s speech is typically through the
verb inflectional system. The next development, around age 2;6, is characterized by
an increase in the number of auxiliaries and/or inflections, which come to be used in
more varied contexts (Behrens, 1993). At this age also temporal distinctions are
made by sentence-modifying adverbials (Bamberg, 1994:206). Children eventually
learn to coordinate the deictic temporal axis of events with the non-deictic time axis
of discourse around the age of 3;0 to 3;6 (Berman and Slobin, 1994). Different
studies have suggested that in constructing the non-deictic relations of temporal
reference, children progress from juxtaposing two independent clauses, which
express events in their order of occurrence, to sequentially relating two clauses with
adverbials that preserve order of occurrence too. Finally, free use of adverbials
without attention to correspondence between order of occurrence and of mention are
acquired.
Notwithstanding the differentiation between time or place, in Dutch adverbials
appear to be fairly common at the early age of 2;0 years (Bol and Kuiken, 1988:56-
57). Around the age of 3;0 years children can combine two adverbials in one clause
in addition to a verb and its arguments (Verhulst-Schlichting, 1987:53). Although
relatively little is known about the kind of abverbials that young Dutch-speaking
children use, De Houwer (1990) found a wide variety of place adverbials in normally
developing children between the age of 2;7 and 3;4. Time adverbials, however, were
The ability to realize lexical categories largely limited to 'nu' (now) and 'dan' (then), and adverbials of manner were largely limited to the form 'zo' (this way; like this).

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

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

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

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

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

- Jeffrey: (en eh) of we spelen vuilnisauto, dat ik die container ben .
  (and eh) or we play rubbish truck that I am that container.
- Jeffrey: dan pak ik ze benen vast.
  then-got-I-his-legs-hold-of.
- Jeffrey: hij houdt me vast.
  he-holds-me-tight.
- Jeffrey: en dan gaat hij ineens +“ hup <omhoog>.
  and then suddenly he goes "hup" <in-the-air>.

**Paraphrasis:**
- en dan gaat hij ineens +“ hup "omhoog".
  and then suddenly he goes "hup" "in-the-air".

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

---

39 +" is a CHILDES symbol for directed speech (see also Appendix 4a).
adverbial to complete the T-unit. This adverbial part expresses the direction of the verb 'gaan' (to go). The omitted particles in case of the use of a particle verb are not counted in the analysis under investigation. Time adverbials mark the starting/end point, duration and frequency of an event, like in 'en morgen gaat hij voor het eerst naar school' (and tomorrow he goes for the first time to school). In Example 22, the adverbial of time is missing.

Example 22  Missing adverbial of time in Dutch (PI-child; age 4:5)

Kimberley: dan gaan we naar bed. then-go-we-to-bed. (then we go to bed).
Kimberley: \(\emptyset\) moet je altijd slapen, als je donker is. \(\emptyset\)-must-you-always-sleep-if-you-dark-is. \(\emptyset\) must you always sleep if you is dark).
Paraphrasis: <then> moet je altijd slapen, als het donker is. <then>-must-you-always-sleep-if-it-dark-is. (=then> you must sleep always if it is dark).

In Example 22, the sentence-initial adverbial of time 'dan' (then) is missing that relates the event in the produced T-units. Sometimes the missing time adverbial in first position is discourse motivated. According to STAP all missing elements in first position must be judged as grammatical, except for missing subjects in first position (Van den Dungen and Verbeek, 1994, 1999:24). However, in order to gain insight into the abilities of PI-children to realize temporal and spatial information, we included the sentence-initial missing adverbials of time, like 'dan' (then) and 'toen' (then), in the analysis of missing adverbial information within the sentence frame. The last category adverbials of other types are expressions of information of manner, state, degree, causality, modality, comparison, negation, restriction, etc. In the following some Dutch examples are given: an adverbial of degree is for example 'erg' (severe), of causality is 'door de regen' (by rain), of modality is 'gelukkig' (happily), of comparison is 'vergeleken met Sophie' (compared to Sophie), of negation is 'niet' (not), and of restriction is 'voor een kabouter' (in case of an elf) (e.g. Haeseryn et al., 1997:1200). Example 23 shows a missing adverbial of manner.

Example 23  Missing adverbial of other type in Dutch: missing adverbial of manner (PI-child; age 8:11). The topic of the conversation is art-swimming.

Shamel: en dan zit je boven water meestal. (and then you are generally above water).
Shamel: dan is dit zo. then-is-it-so.
\(\%\text{gpx}\): geeft stand benen aan met armen then-is-it-so.
\(\%\text{gpx}\): explanation position legs with arms (then it is like this).

40  \(\%\text{gpx}\) is the CHILDES symbol for gestural and proximal information (see Appendix 4a).
The ability to realize lexical categories

Shamel: en dan zit dit Θ.
and-then-sits-it Θ.
(and then it sits Θ).

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

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

5.7.2 Results: Missing Adverbials

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

<table>
<thead>
<tr>
<th>Missing Adverbials</th>
<th>N-children n=45</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>PI-children n=60</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td></td>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing adverbials in general</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>1.80</td>
<td>4%</td>
<td>1.70</td>
<td></td>
<td>4.35</td>
<td>9%</td>
<td>3.73</td>
<td></td>
</tr>
<tr>
<td>6 yrs</td>
<td>1.93</td>
<td>4%</td>
<td>1.53</td>
<td></td>
<td>5.00</td>
<td>10%</td>
<td>3.83</td>
<td></td>
</tr>
<tr>
<td>8 yrs</td>
<td>1.67</td>
<td>3%</td>
<td>2.02</td>
<td></td>
<td>4.05</td>
<td>8%</td>
<td>2.37</td>
<td></td>
</tr>
<tr>
<td>Total mean</td>
<td>1.80</td>
<td>4%</td>
<td>1.73</td>
<td>4.47</td>
<td>9%</td>
<td>3.34</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

---

\(^{41}\) ANOVA with Missing adverbs in general as dependent variable and group (N-PI) and age (4-6-8yrs) as independent variables. No significant age or group*age interaction effect were found.

\(^{42}\) ANOVA with Missing adverbs of place as dependent variable and group (N-PI) and age (4-6-8yrs) as independent variables. No significant effect for age or group*age interaction effect were found.

\(^{43}\) ANOVA with Missing adverbs of time as dependent variable and group (N-PI) and age (4-6-8yrs) as independent variables. No significant effect for age or group*age interaction effect were found.

\(^{44}\) ANOVA with Missing adverbs of other type as dependent variable and group (N-PI) and age (4-6-8yrs) as independent variables. No significant effect for age or group*age interaction effect were found.
When we look at the distribution of categories, both populations show the most problems in realizing adverbials of time with respect to the other two types of adverbials (Figure 5.10). The problems with expressing temporal information contribute importantly to the problems found with adverbial information in general in the two groups. Whereas 6 and 8-year-old N-children seem to have overcome their problems with adverbials of place, these problems have not disappeared in the oldest PI-children. The results found in the N-children are in line with the expectation that adverbials of place are acquired earlier than adverbials of time (Gillis and De Houwer, 1998).
We conclude that PI-children are not comparable to N-children: they leave spatial, temporal and adverbial information of other types implicit in obligatory contexts too often. Finally, the correlation between the distribution of the different types of missing adverbials is investigated and shown in Table 5.12. The first Pearson correlation coefficient per age group concerns the correlation between errors of place and time (P-T), the second coefficient the correlation between errors of place and other type (P-O) and the last coefficient the correlation between errors of time and other type (T-O).

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

<table>
<thead>
<tr>
<th>Pearson correlation coefficient</th>
<th>Missing adverbials of place, time and other</th>
<th>N-children</th>
<th></th>
<th>PI-children</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>value</td>
<td>sign.</td>
<td>value</td>
<td>sign.</td>
</tr>
<tr>
<td>4yrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-T</td>
<td>-.278</td>
<td>.158</td>
<td></td>
<td>-.177</td>
<td>.227</td>
</tr>
<tr>
<td>P-O</td>
<td>-201</td>
<td>.237</td>
<td></td>
<td>.174</td>
<td>.232</td>
</tr>
<tr>
<td>T-O</td>
<td>-.166</td>
<td>.277</td>
<td></td>
<td>-.561**</td>
<td>.005</td>
</tr>
<tr>
<td>6yrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-T</td>
<td>-.126</td>
<td>.298</td>
<td></td>
<td>-.189</td>
<td>.212</td>
</tr>
<tr>
<td>P-O</td>
<td>-.189</td>
<td>.212</td>
<td></td>
<td>-.347</td>
<td>.067</td>
</tr>
<tr>
<td>T-O</td>
<td>-.533*</td>
<td>.020</td>
<td></td>
<td>-.237</td>
<td>.157</td>
</tr>
<tr>
<td>8yrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-T</td>
<td>-.309</td>
<td>.131</td>
<td></td>
<td>-.399*</td>
<td>.041</td>
</tr>
<tr>
<td>P-O</td>
<td>-</td>
<td>-.438*</td>
<td>.027</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T-O</td>
<td>-.309*</td>
<td>-.419**</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Correlation is significant at the .05 level (1-tailed).
** Correlation is significant at the .01 level (1-tailed).
* (remark): the correlation cannot be computed because at least one of the variables is constant.
In both populations, more in the PI than in the N-children, there is a significant co-occurrence of frequently missing adverbials of time with frequently missing adverbials of other types (N-children: p<.020; PI-children: p<.000), predominantly in the six-year-old N-children (p<.020) and the four and eight-year-old PI-children (4yrs: p<.005; 8yrs: p<.041). The eight-year-old N-children seem to have almost overcome the problems in expressing temporal relations and relations of the other type, whereas in the eight-year-old PI-children these problems are not decreasing and there is also a significant co-occurrence of missing adverbials of place and other types (p<.027). It seems that PI-children find it difficult to express the correct temporal information and information of manner, state, the degree, etc. Thus, contrary to our expectations, the eight-year-old PI-children have most problems with expressing adverbials, since the co-occurrence of missing adverbial in-formation is the highest in this age group as opposed to the eight-year-old N-children.

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

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

PI-children frequently leave obligatory syntactic information, i.e. lexical categories, more often implicit than their age-related peers. The interviews of PI-children contain therefore many minimalized information units that frequently fail to contain one or more structural elements, such as lexical verbs, nouns and pronouns in subject and object position, prepositions and adverbials (Table 5.13). A subgroup of PI-children had significantly more missing lexical verbs, frequently resulting in verbless T-units. The use of verbless T-units in PI-children indicates that they can give only static descriptions of real life situations, instead of naming actions that are necessary in order to relate successive or simultaneous events into coherent discourse (see also 9.4 and 13.4). Although, contrary to our expectations, the N-children did not express more lexical verbs with age, we observed that the PI-children were significantly worse, indicating that the PI-children genuinely have morphological/syntactic problems in this area (see 4.2 and 4.3).

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

<table>
<thead>
<tr>
<th>Missing lexical categories</th>
<th>N-children n=45</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missing lexical verbs</td>
<td>3%</td>
<td>8%*</td>
</tr>
<tr>
<td>Missing ungrammatical subjects</td>
<td>2%</td>
<td>4%*</td>
</tr>
<tr>
<td>Missing ungrammatical objects</td>
<td>3%</td>
<td>6%*</td>
</tr>
<tr>
<td>Missing prepositions</td>
<td>3%</td>
<td>6%*</td>
</tr>
<tr>
<td>Missing adverbials</td>
<td>4%</td>
<td>9%*</td>
</tr>
<tr>
<td>Place</td>
<td>0.2%</td>
<td>0.6%*</td>
</tr>
<tr>
<td>Time</td>
<td>3.1%</td>
<td>5.5%*</td>
</tr>
<tr>
<td>other types</td>
<td>0.7%</td>
<td>2.9%*</td>
</tr>
</tbody>
</table>

* indicates a significant result

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

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

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

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

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