Language development in children with psychiatric impairment.

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The ability to transmit relevant information: use of cohesive devices

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13.1 Introduction
We have already mentioned that the correct use of cohesive devices plays a part in the semantic connections within and between communicative contributions (see 12.1). With the correct use of cohesive devices linguistic messages can become clearer, more transparent, and thus easier to interpret; all of which are prerequisites for a message to be relevant. For the analysis of cohesion (part of) the typology designed by Halliday and Hasan (1976) has been used to investigate different kinds of cohesive devices that children use, following Roelofs (1996). The analysis here is restricted to ellipsis, conjunctions/subjunctions and co-referential cohesion, following Roelofs (1998) (Table 13.1).

Table 13.1 Classification of different types of cohesive devices (Halliday and Hasan, 1976)

<table>
<thead>
<tr>
<th>Main types</th>
<th>Classification</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ellipsis</td>
<td>nominal ellipsis (NP)</td>
<td>you have two cats. I have only one ( \theta )</td>
</tr>
<tr>
<td></td>
<td>verbal ellipsis (VP)</td>
<td>you drink milk and I ( \theta ) coffee.</td>
</tr>
<tr>
<td></td>
<td>clausal ellipsis (VP+NP)</td>
<td>do you have pets? Yes, ( \theta ) two dogs.</td>
</tr>
<tr>
<td>Conjunctions</td>
<td>additive conjunction</td>
<td>and/or</td>
</tr>
<tr>
<td></td>
<td>adversative conjunction</td>
<td>but</td>
</tr>
<tr>
<td></td>
<td>causal conjunction</td>
<td>because/thus</td>
</tr>
<tr>
<td></td>
<td>temporal conjunction</td>
<td>then/now</td>
</tr>
<tr>
<td></td>
<td>continuative conjunction</td>
<td>well</td>
</tr>
<tr>
<td>Lexical cohesion</td>
<td>synonymy</td>
<td>cat - pussy</td>
</tr>
<tr>
<td></td>
<td>repetition</td>
<td>cat - cat</td>
</tr>
<tr>
<td></td>
<td>co-occurrence</td>
<td>siblings: brother - sister; they wet - dry</td>
</tr>
<tr>
<td></td>
<td>contrast</td>
<td>I have a cat, a real monster</td>
</tr>
<tr>
<td></td>
<td>substitution</td>
<td></td>
</tr>
<tr>
<td>Co-reference</td>
<td>pronominal reference</td>
<td>the boy walks. <em>he</em> stumbles.</td>
</tr>
<tr>
<td></td>
<td>demonstrative reference</td>
<td>I have a dog. <em>that</em> loves cats.</td>
</tr>
<tr>
<td></td>
<td>comparative reference</td>
<td>I have two dogs. <em>One</em> loves cats.</td>
</tr>
</tbody>
</table>

From section 8.3 we know that the PI-children produce significantly fewer correctly formed clausal ellipsis constructions than the N-children from the Roelofs-population (1998), although morphological/syntactic correctness is a prerequisite for semantically/pragmatically correct use of clausal ellipsis. From section 8.4 it also became clear that the PI-children tend to have difficulties with explicating the specifier position of the functional head-category complementizer, covering...
subordinate conjunctions. We may therefore expect some semantic/pragmatic difficulties in this area. Here, we want to investigate whether the PI-children are as good in establishing cohesion as the N-children. And, is there comparable development with age?

Children have to learn to fit their communicative contributions into the ongoing discourse by using cohesive devices. They therefore have to learn to connect the language information expressed to prior (given) information. Three main principles are involved in using cohesive devices. First, children have to learn what information to make explicit. For instance, they have to learn to express coordinating and subordinating conjunctions explicitly in the correct form and the proper position in the sentence. Second, they have to learn what information to leave unexpressed and implicit, for instance, in clausal ellipsis constructions. Third, children have to learn to refer by other words to the same issues, for example, when establishing co-referential and lexical cohesion (e.g. Koster, 1993:1). All cohesive devices have in common that the semantic interpretation of a linguistic unit is (partly) dependent on prior mentioned information in the discourse (Halliday and Hasan, 1976:4); and, by use of cohesive devices, it is made possible to express a maximum of meaning with a minimum of words.

From Chapter 12, it can be said that the use of cohesive devices to achieve cohesion falls under the Maxim of Manner: be clear (see 12.7). The Maxim of Quantity must also be followed in the case of co-referential cohesion and clausal ellipsis: leave implicit what has been mentioned already (see 12.6). Both Maxims of Manner and Quantity are closely related to the Maxim of Relevance (Grice, 1975; Sperber and Wilson, 1986). If both maxims are followed, a communicative contribution can be judged as being relatively more relevant, creating a greater communicative effect with relatively limited linguistic effort. However, both speaker and listener probably have to exert more computational effort in order to grasp the message.

In sum, successful participation requires that children (analyse and) express different cohesive chains in the ongoing conversation by means of different cohesive devices. When children frequently and correctly use cohesive devices, this influences the quality of the interview positively. Thus, the amount of correctly used cohesive devices per interview is globally indicative of the ability to transmit relevant, cohesive information.

In general, when N-children become older, they become more cohesive (Bishop and Adams, 1989). LI-children, however, have difficulties using cohesive devices correctly, for instance, in establishing clear co-referential cohesion (Sahlén and Nettelbladt, 1993). In order to investigate the use of cohesive devices in the PI-children as compared to the N-children, we made a selection of different types of cohesive devices. In the following, we will present the analysis of the use of clausal

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1 The use of adverbial cohesion is incorporated in the analysis of jumps (see 12.5: Violations of the Maxim of Quantity). Nominal ellipsis and lexical cohesion of nominals are coded under the heading.
The use of cohesive devices

ellipsis (13.2) and the use of connectives, such as conjunctions and subjunctions (13.3). We will present the results with respect to co-referential cohesion (13.4), divided into the ability to produce clear referent introductions (13.5), referent maintenances (13.6) and referent shifts (13.7), ending with some conclusive remarks about the ability to establish co-referential cohesion (13.8). Finally, we will end with an overview of the ability to transmit relevant information by means of cohesive devices (13.9). If we detect difficulties in this area, especially in the realization of co-referential cohesion, this might very well be a good indication of a semantic/pragmatic disorder (e.g. McTear and Conti-Ramsden, 1992; Van den Dungen and Verbeek, 1994, 1999) (see 1.2).

13.2 Clausal Ellipsis

13.2.1 Research questions, definitions and operationalisations
Grammatical clausal ellipsis consists of the regular omission of one or more sentence constituents, frequently the lexical categories, subject and verbal predicate that are redundant with respect to a prior message (see 8.3) (Root, 1992; Renkema, 1993:38; Haeseryn et al., 1997). Instances of clausal ellipsis were described that were grammatically correctly used (see 8.3). In this way the ability to produce complex, reduced clauses was measured; these clauses are a one-to-one mapping of morphological/syntactic categories that are left implicit without causing ungrammaticality.

Here, we look at the same instances, but from a different perspective, namely from a semantic/pragmatic point of view. When clausal ellipsis is morphologically/syntactically incorrect (see 8.3), the clausal ellipsis construction is also semantically/pragmatically incorrect, since no clear cohesion is established. Then the Maxims of Quality and Relevance are violated (in a different way than presented in 12.8). But when a clausal ellipsis is morphologically/syntactically correct, it can still be semantically/pragmatically inappropriate.

Instances of semantically/pragmatically (S/P) correctly used clausal ellipsis are described in order to determine the complex ability to achieve cohesiveness in the conversational interview genre by the elimination of redundancy by means of clausal ellipsis. We want to explore whether the amount of S/P correctly used clausal ellipsis constructions in the PI-children is comparable to the amount in the N-children. And, is there comparable development with age?

In order to answer the question we first counted all instances of clausal ellipsis, earlier mentioned in the Dutch developmental literature as 'ellipsis' or 'elliptical answer' (Van den Dungen and Verbeek, 1994, 1999). In the conversational interview genre open or alternative questions expressed by the interviewers frequently give N- and PI-children the choice to answer with a clausal ellipsis construction (Example 1) or not.

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of co-referential cohesion. The grammaticality of verbal ellipsis is coded under the heading of conjunction reduction (see 8.4).
As mentioned above (see 13.1), since the PI-children produce significantly fewer correctly formed clausal ellipsis constructions than the N-children from the Roelofs-population (1998), we expect to find a lower amount of semantically/pragmatically correct clausal ellipsis constructions in the PI-children than in the N-children. If this difference is significant, the ability to establish clear cohesion by means of clausal ellipsis constructions would seem to be problematic for some PI-children.

Next, on the basis of a morphological/syntactic (M/S) paraphrasis and semantic/pragmatic (S/P) paraphrasis, errors/violations in both language areas were identified (Example 2).

In Example 2, the MS Paraphrasis shows that by leaving the article 'a' unexpressed the PI-child does not express the functional head within a noun phrase. This may be related to difficulties in identifying the boundaries of a noun phrase. This type of morphological/syntactic incorrectness was frequently observed in the PI-children (see 8.3.3).

Next, the SP Paraphrasis shows that the PI-child is not establishing a clear cohesive relationship between the question asked and the answer given. When we 'fill in' the clausal ellipsis construction after morphological/syntactic correction, the contribution "I like to play with a television" is judged to be incohesively linked to the previous one. The PI-child is erroneously presenting a television as a toy to play with: a semantic error. The pragmatic contingency of the answer is then affected and pragmatically marked. In the next section, we will present the results of the semantic/pragmatic analysis that concerns the ability to establish clear cohesive links by means of clausal ellipsis constructions.
13.2.2 Results: Clausal Ellipsis

Although we know from 8.3 that the PI-children produce a number of clausal ellipsis constructions comparable to the N-children, from Figure 13.1 it is obvious that the PI-children (32.3%) produce significantly\(^2\) more clausal ellipsis than the N-children (24.6%) in reaction to first pairparts expressed by the interviewer.

*Figure 13.1* The percentage clausal ellipsis calculated over all second pairparts expressed by 75 N-children and 120 PI-children

These clausal ellipsis constructions were not judged here as to whether they were minimal or not (see 11.3). A high amount of minimal clausal ellipsis constructions is also indicative for being unmotivated to engage in communicative interaction (see 2.3.1). This has been frequently observed in LI-children (e.g. Fey and Leonard, 1983; Van den Dungen and Verbeek, 1994, 1999). Unlike the LI-children, the PI-children use a comparable amount of minimal clausal ellipsis constructions compared to the N-children (see 11.3.2). The N- and PI-children, however, seem to produce relatively many clausal ellipsis constructions. This is different from the results obtained from 10 English-speaking Specific LI-children and 10 same-aged N-children (7;0 tot 10;0 years) in research by Craig and Evans (1993). These N- and Specific LI-children were observed to produce ellipsis so infrequently that it could not be statistically analysed.

From Figure 13.2 we see that the PI-children make more incorrect clausal ellipsis in terms of semantics/pragmatics than the N-children. This difference proved to be

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\(^2\) ANCOVA with the mean total number of second pairparts of the child as covariate; group effect F(1,164)=23.37, p<0.001; no age- or age*group interaction effect was observed (nine-year-old PI-children excluded).
highly\textsuperscript{3} significant. We also compared the percentage of clausal ellipsis constructions that are morphologically/syntactically (M/S) incorrectly formed (see 8.3) \textit{and} semantically/pragmatically (S/P) incorrectly used. Up to the age of six years clausal ellipsis constructions were incorrect mainly in morphology and syntax and when paraphrased, were less often semantically/pragmatically incorrect. This relationship changes at age six when the morphological and syntactic errors decrease and therefore the semantic/pragmatic problems are highlighted.

\textbf{Figure 13.2} The percentage incorrect clausal ellipsis in terms of semantics/pragmatics calculated over the mean total number of clausal ellipsis expressed by 75 N-children and 120 PI-children.

\begin{center}
\begin{tabular}{|c|c|c|c|c|c|}
\hline
& 4 yrs & 5 yrs & 6 yrs & 7 yrs & 8 yrs & 9 yrs \\
\hline
N-chi: \% wrong ellips & 6.6 & 8.8 & 6.6 & 4.1 & 1.7 & \\
\hline
PI-chi: \% wrong ellips & 28.2 & 31.8 & 20.4 & 32.1 & 35.2 & 22.2 \\
\hline
\end{tabular}
\end{center}

\subsection{13.2.3 Conclusion: Clausal Ellipsis}

The PI-children have difficulties in establishing clear cohesion between an initiative of the PI-interviewers and their own responses by means of clausal ellipsis compared to the N-children; no clear cohesion is established by means of clausal ellipsis in, on average, one out of four instances in the PI-children, whereas this is only the case in less than one out of ten instances in the N-children. We showed that the younger PI-children could not establish clear cohesion by means of clausal ellipsis constructions mainly because of morphological/syntactic difficulties. The older PI-children could not establish clear cohesion by means of clausal ellipsis constructions mainly because of semantic/pragmatic difficulties.

\textsuperscript{3} ANCOVA with the mean total number of ellipsis as covariate; group effect: F(1,164)=92.13, p<0.0001; no age- or age\textsuperscript{6}group interaction effect was observed (nine-year-old PI-children excluded).
13.3 Conjunctions and Subjunctions in conversation

13.3.1 Definitions, research questions and operationalisations

Co-ordinating conjunctions and subordinating conjunctions, further referred to as conjunctions and subjunctions, are linguistic devices that can be used in order to establish cohesion. By the use of conjunctions T-units can be connected and by the use of subjunctions within a T-unit subordinate clauses can be connected to a main clause and relative clauses can be connected to noun phrases (see 8.5). We coded the different types of conjunctions divided by Halliday and Hasan (1976) and different types of subjunctions divided by Scheper (1996), following the first application by Roelofs (1998:117-119). Here, we look at the same instances, but from a different perspective, namely from a semantic/pragmatic point of view. Different types of conjunctions/subjunctions have different inherent meanings that by their use express how (within clauses) contributions are semantically connected (e.g. Smith and Leinonen; 1992:85). All types are language-specific in their content, form and function; in Dutch they are related to certain word-order rules (Geerts et al., 1984:642-743; Haegeman, 1991; Haeseryn et al., 1997:1379). The semantic meaning of the used sub/conjunctions and the impact on the pragmatic level is of most importance here. Whereas in Dutch conjunctions can be an optional grammatical category, subjunctions are always grammatical obligatory. However, co-ordinating conjunctions can only be morphologically/ syntactically optional, if the meaning on how to cohesively connect two contributions is absolutely clear. Subjunctions are always grammatically obligatory in order to connect the left- and right-branched subordinate clauses and right-branched relative clauses in Dutch to their main clause (e.g. Haeseryn et al., 1997) (Table 13.2).

Table 13.2 Conjunctions and Subjunctions

<table>
<thead>
<tr>
<th>Conjunctions</th>
<th>additive conjunction</th>
<th>adversative conjunction</th>
<th>causal conjunction</th>
<th>temporal conjunction</th>
<th>continuative conjunction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>en (and); or (of)</td>
<td>maar (but); alleen (only)</td>
<td>want (because)</td>
<td>dan (then); toen (then); en toen/ en dan</td>
<td>nou (well)</td>
</tr>
<tr>
<td>Subjunctions</td>
<td>no types divided⁴</td>
<td>dat (that)</td>
<td>omdat (because)</td>
<td>zodat (so that) etc.</td>
<td>terwijl (in the mean while)</td>
</tr>
</tbody>
</table>

At the age of three N-children start to use conjunctions, followed by subjunctions (Bol and Kuiken, 1988; De Houwer, 1990). They start to learn to use additive and temporal linkage before adversative and causal linkage of contributions (see 8.5).

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⁴ The same subtypes can be divided for subjunctions as for conjunctions (Scheper, 1996).
This means that before age six, N-children in general mostly use simple conjunctions to connect simple sentences, such as 'and', 'then' and 'and then', whereas 'but', 'thus' or 'because' are very infrequently used (Peterson and McCabe, 1992; Benson, 1993). From age six on, N-children learn to cohesively link contributions by means of different types of conjunctions and subjunctions in different contexts.

Like Swedish-speaking Specific LI-children (Hakansson and Hansson, 2000) (see 8.5), the PI-children make more morphological/syntactic errors in the production of co-ordinating and subordinating conjunction, such as leaving them unexpressed, compared to the N-children (see 8.5).

Here, we want to explore whether the amount of semantic/pragmatically correctly used conjunctions and subjunctions in the PI-children is comparable to the amount in the N-children. And, is there comparable development with age?

We not only examined if the distribution of the different types of conjunctions and subjunctions is the same in the PI- and N-children, but we also made an error-analysis. We may expect some problems in this area in the PI-children compared to the N-children, although with age the use of these types of connectives in order to establish cohesion is expected to improve in both populations.

13.3.2 Results: Conjunctions and Subjunctions

From Figure 13.3 we see that the PI-children produce significantly fewer conjunctions than the N-children. Thus, the PI-children lag behind in their development of the cohesive use of conjunctions. Unexpectedly, post-hoc trend analysis showed no significant linear increase of the production of conjunctions in either group (see also Roelofs, 1998:119).

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5 We excluded the connective conjunctions *nou* (well), because in Dutch this type of conjunctions was difficult to separate from interjections in a reliable way.

6 The percentage expressed conjunctions and subjunctions was calculated over the mean total number of communicative contributions (except for yes/no-responses) per child. For the statistical analysis we used an ANOVA (the ANCOVA was of no use here, because with respect to the covariant 'the number of communicative contributions coded for topic' no significant group effect was found). Group effect: $F(1,165)=14.57, p<0.001$; age effect $F(4,165)=3.59, p<0.008$; no significant age*group interaction effect was observed (nine-year-old PI-children excluded).

With respect to the different types of conjunctions we used ANCOVA's with the mean total number of conjunctions as covariate. To interpret the results of the error-analysis, we used an ANCOVA with the mean total number of conjunctions, respectively subjunctions as covariate.

7 One-way ANOVA over percentages.
Figure 13.3  The percentage conjunctions calculated over all communicative contributions (coded for topic) expressed by 75 N-children (Roelofs, 1998) and 120 PI-children

With the production of subjunctions an even greater degree of complexity is involved than in the use of conjunctions in Dutch, because the use of subjunctions is connected to a word-order specification within the subordinate clause, namely that the inflected verb must be in sentence-final position (see 8.5). We indeed observed a relatively infrequent production of subjunctions (N-children: 7.2%; PI-children: 5.5%) (Figure 13.4) when compared to the production of conjunctions (N-children: 48%; P-children: 40%) (nine-year-old PI-children excluded).

We see that the PI-children also produce significantly fewer subjunctions than the N-children. The developmental pattern of the production of subjunctions resembles a reversed U-curve: the six- and seven-year-olds in both groups use relatively many subjunctions. Therefore, no linear age effects are found in either population.

Roelofs (1998:119) showed with respect to the ability to establish cohesion by means of con/subjunctions, that there is a decrease in the production of con/subjunctions in the eight-year-old N-children that corresponds with earlier Dutch reports about a similar developmental pattern found in the 240 N-children from the STAP-population (Van den Dungen and Verbeek, 1999; see 3.2.2). The PI-children show a comparable developmental pattern but we do not have an explanation for this yet.

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8 ANOVA over percentages; group effect: $F(1,165)=8.22, p<0.005$; age effect $F(4,165)=3.78, p<0.005$; no age*group interaction effect was observed (nine-year-old PI-children excluded).
Chapter 13 Semantic/Pragmatic conversational development

Figure 13.4 The percentage subjunctions calculated over all communicative contributions (coded for topic) expressed by 75 N-children (Roelofs, 1998) and 120 PI-children

In Table 13.3 the distribution of the different types of conjunctions is presented. We observe that the PI-children use significantly fewer additive\(^9\) and significantly more temporal conjunctions\(^{10}\) than the N-children. Post-hoc trend analysis showed no linear age-effects\(^{11}\) in both populations.

Table 13.3 The mean total percentage conjunction types (additive (Add), adversative (Adv), causal (Causal) and Temporal (Temp)) calculated over all conjunctions expressed by 75 N-children (Roelofs, 1998) and 120 PI-children

<table>
<thead>
<tr>
<th>Conjunction types</th>
<th>N-children n=75</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Add</td>
<td>Adv</td>
</tr>
<tr>
<td>4 yrs</td>
<td>58%</td>
<td>22%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>57%</td>
<td>22%</td>
</tr>
<tr>
<td>6 yrs</td>
<td>58%</td>
<td>18%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>64%</td>
<td>19%</td>
</tr>
<tr>
<td>8 yrs</td>
<td>58%</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td>59%</td>
<td>20%</td>
</tr>
</tbody>
</table>

The N-children most frequently use additive conjunctions (59%), followed by adversative (20%), causal (13%) and temporal (8%) conjunctions. The production of

\(^9\) ANCOVA with the number of all conjunctions as covariate; group effect F(1,164)=53.30, p<0.0001; no age- or age*group interaction effect was observed (nine-year-old PI-children excluded).

\(^{10}\) ANCOVA with the same covariate; group effect F(1,164)=103.00, p<0.0001; age effect (F(4,164)=2.90, p=0.024); no age*group interaction effect was found (nine-year-old PI-children excluded); no linear age effect (Polynomial).

\(^{11}\) ANCOVA (Polynomial contrast): no significant linear age effect are found in both populations (nine-year-old PI-children included).
causal conjunctions increases (9% to 13%) and the production of temporal conjunctions decreases (10% to 8%) between four and five years of age in the N-children. This may indicate that the development of using semantically more complex connections starts at age five in the N-children.

These results do not confirm earlier reports about the development of conjunctions (Berman and Slobin, 1994) that showed a rapid significant decrease with age in the production of additive and temporal conjunctions, also called markers of sequentiality, in school-aged N-children. This difference is probably due to differences in research design.

In the PI-children we see a different distribution in the use of conjunction types: additive conjunctions (44%) are used most frequently, followed by temporal (26%), adversative (20%) and causal conjunctions (11%). Between four and five years of age, the production of causal conjunctions also increases (8% to 13%) and of temporal conjunctions also decreases (32% to 18%) in the PI-children, comparably to the N-children.

It appears that around five years, the N- and PI-children start to reduce the production of additive/temporal conjunctions for successive cohesive linkage in favour of adversative/causative conjunctions for logical/hierarchical cohesive linkage.

However, the production of temporal conjunctions in the PI-children stays relatively high even in the oldest age groups. A closer look at the data shows that they frequently use only two types 'en toen' (and then past tense) and 'en dan' (and then present tense) (and then: near future in past time) and (and then: near future in present time), often in successive chains (and then.... and then.... and then...). This indicates a disability in using more precise adverbs to express temporal sequentiality (see also 5.7 and 6.3). This marker of sequentiality was also coded by Berman and Slobin (1994), who observed a reduction from 26% (calculated over all conjunctions) in English-speaking four-year-olds to 15% in the nine-year-olds. We therefore have the impression that the nine-year-old PI-children behave like four-year-old N-children.

Next, how many errors in the cohesive use of conjunctions and subjunctions can be found in the PI-children? Omissions of specific types of conjunctions and subjunctions are excluded here, because they are described elsewhere in detail (see 8.4 and 8.5). In the following, we will give some examples of semantically/pragmatically (S/P) incorrect cohesive use of conjunctions (Examples 3 to 6) and subjunctions (Example 7).

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12 'en toen' (and then past tense) / 'en dan' (and then present tense) are coded as temporal conjunctions ('en' (and) in both constructions was not coded as a separate additive conjunction, since 'toen' and 'dan' are adverbs of time used as conjunctions (called 'voegwoordelijke bijwoorden' in Dutch; Geerts et al., 1984-401; Scheper, 1996).
Example 3  
*Semantically/pragmatically incorrect cohesive use of an additive conjunction (PI-child; age 4;2)*

Interviewer:  
wat eet je graag op je boterham?
(what do you like to eat on your bread?)

Willem:  
*en één met pindakaas.*
(and one with peanutbutter)

Paraphrasis:  
peanutbutter.

In Example 3, the additive conjunction suggests that there is prior information about another slice of bread, which was not the case. The 'en' (and) is not appropriate.

Example 4  
*Semantically/pragmatically incorrect cohesive use of an adversative conjunction (PI-child; age 4;7)*

Charlie:  
de juf leest ons elke dag voor.
(the teacher reads to us everyday)

Charlie:  
maar de juf heeft zo'n boek.
(but the teacher has got such a book)

Paraphrasis:  
and the teacher has got such a book.

In Example 4, the PI-child uses 'maar' (but) instead of 'en' (and). Another example of the same type is the semantically marked cohesive use of 'and' (additive conjunction) instead of 'but' (adversative conjunction), or 'want' (because; used as conjunction; no equivalent in English) instead of 'en' (and) (Example 5).

Example 5  
*Semantically/pragmatically incorrect cohesive use of a causal conjunction (PI-child; age 4;9)*

Interviewer:  
is Daniella jouw zus?
(is Daniella your sister?)

Kevin:  
nee
(noe)

Kevin:  
want ze is al groot
(because she is already tall/grown up)

Paraphrasis:  
and she is already tall/grown up

In Example 5, the conjunction 'want' (because; conjunction) is marked because it illogically connects contributions. This use only makes sense if the PI-child were to think that someone can only be a sister if they are small.

Example 6  
*Semantically/pragmatically incorrect cohesive use of a temporal conjunction (PI-child; age 4;11)*

Rick:  
het was in de avond.
(it was in the evening)

Rick:  
*en dan ging ik stoeien met mijn hond.*
(and then (present) I started playing with my dog)

Paraphrasis:  
*en toen ging ik stoeien met mijn hond*
(and then (past) I started playing with my dog)

Example 6 is illustrative for a disagreement between the tense expressed by the conjunction and verbal markers for past tense (see also 7.2).
Marked use of subjunctions frequently are characterized by a semantic mismatch that was also coded as a morphosyntactic error (Example 7).

**Example 7**

*Semantically/pragmatically incorrect cohesive use of a subjunction (PI-child; age 5;1)*;

<table>
<thead>
<tr>
<th>Paraphrasis:</th>
<th>dat duurt nog lang tot ze twee is.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>dat duurt nog zo lang, namelijk tot dat ze twee is.</td>
</tr>
<tr>
<td>(that (=getting teeth) takes so long, namely until she is two)</td>
<td></td>
</tr>
</tbody>
</table>

In Table 13.4 we present the frequency of errors in the cohesive use of conjunctions and subjunctions made by the PI-children; no data are available for the N-children. We see that the amount of cohesive conjunction errors of all types (mean total: 7%) is comparable to the amount of cohesive subjunction errors (7%).

When we look at the conjunction errors, we see that - as could have been expected - the PI-children make relatively few errors in the production of semantically less complex and most frequently used additive/temporal conjunctions, but make relatively many errors in the production of the more complex and less frequently used adversative/causal conjunctions.

The relatively high production of temporal conjunctions by the PI-children (Table 13.3) seems to resemble that of N-children younger than four years (Peterson and McCabe, 1992). The PI-children mostly use temporal conjunctions cohesively and correctly to express a temporal meaning; they only make 3% errors (Table 13.4). N-children in contrast frequently overgeneralize the cohesive use of temporal conjunctions in order to express, for instance, adversative and causal connections.

Table 13.4  

<table>
<thead>
<tr>
<th>Incorrectly used Conjunctions/ Subjunctions</th>
<th>Conjunctions</th>
<th>Subjunctions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pi-children n=120</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>11%</td>
<td>21%</td>
</tr>
<tr>
<td>5 yrs</td>
<td>2%</td>
<td>5%</td>
</tr>
<tr>
<td>6 yrs</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>7 yrs</td>
<td>1%</td>
<td>13%</td>
</tr>
<tr>
<td>8 yrs</td>
<td>2%</td>
<td>8%</td>
</tr>
<tr>
<td>Total</td>
<td>4%</td>
<td>10%</td>
</tr>
<tr>
<td>9 yrs</td>
<td>8%</td>
<td>10%</td>
</tr>
</tbody>
</table>

We see that from age five on, fewer errors are made in the cohesive use of all conjunction types, although in the higher age groups, especially in the nine-year-old PI-children, relatively many errors are still made. When we look at the production of
subjunctions, we see another, non-comparable pattern. The six-year-old PI-children not only produce relatively many subjunctions, but also produce most errors. Unexpectedly, no significantly\(^\text{13}\) linear decrease with age in the amount of errors in the cohesive use of conjunctions and subjunctions in the PI-children was observed.

### 13.3.3 Conclusion: Conjunctions and Subjunctions

The PI-children show difficulties in the ability to establish clear cohesion by means of conjunctions and subjunctions. The PI-children use significantly fewer conjunctions and subjunctions than the N-children and make relatively many errors (7% of all cases) in the cohesive use of conjunctions and subjunctions. The developmental patterns in the production of conjunctions and subjunctions by the N- and PI-children resemble more or less a flat reversed U-curve, we have no explanation for at this moment. Relatively many errors are still made by the PI-children in the higher age groups. Possibly, the overall integration of multileveled linguistic information in the older age-groups can cost so much planning effort that the fine-tuned use of conjunctions and subjunctions in order to establish cohesion somehow stagnates.

### 13.4 Co-referential Cohesion in conversation: an introduction

Co-referential cohesion deals with a semantic cohesive relationship that can be expressed between entities that are named by words. To mention an entity for the first time is coded as *first mention* and to mention the same entity again is coded as *subsequent mention*. The word used for subsequent mention, called *referent* (e.g. the personal pronoun 'he'), refers to its *antecedent* (e.g. the boy), that is the word used for first mention within the conversational interview (or narrative). Antecedent and referent both refer the same mental representation of an entity (e.g. Renkema, 1993:38).

To mention entities and maintaining reference to them over several communicative contributions is also one of the major developments in school-aged children. Roelofs (1998:120) showed that the 75 N-children improve this ability with age; the older N-children make fewer unclear introductions and maintain reference more clearly by means of pronouns than the younger N-children.

In order to use various referential devices clearly and intelligibly, children have to learn semantic/pragmatic cohesive rules for elements internal to the T-unit, that are largely based on morphological/syntactic rules, called binding principles (e.g. Lust, 1986). They also have to learn similar rules for elements external to the T-unit. The latter have not yet been fully described in the literature. Use of clear referential devices is not only a crucial condition for constructing cohesive longer turns, but also for constructing coherently topic-related answers in the conversational interview genre (see 12.1).

As opposed to the N- and PI-children, the interviewers - as is the case with listeners in general - have to infer the cohesive semantic relation between a referent and its

\(^{13}\) ANCOVA (Polynomial contrast) with the number of subjunctions as covariate; no linear age effect was found (nine-year-old PI-children included).
antecedent. The listener uses different linguistic cues and weights them against each other in order to come to the best-guess interpretation.

The following cohesive cues have been discussed in the literature for Dutch (e.g. Koster, 1993:3) and English (Chomsky, 1981; Lust, 1986):

1. when the lexical meaning of the referent and its antecedent, like number and gender, are the same or the lexical relationships (e.g. super- to subordination within a semantic field) is clear, then referent and antecedent are very likely to be cohesively bound;
2. when the lexical meaning and semantic characteristics of the verbs involved clearly cohesively link referent and antecedent (e.g. 'I am called Bart'), then referent ('Bart') and antecedent ('I') are very likely to be cohesively bound;
3. when the syntactic and thematic role of the referent (e.g. 'he is walking') and its antecedent ('the old man is outside') are identical, then referent ('he') and antecedent ('the old man') are very likely to be cohesively bound;
4. when the word-order positions of the referent ('who loves you') and its antecedent (e.g. 'the man') leave no or little language material in between, then referent ('who') and antecedent ('he') are very likely to be cohesively bound (in 'the man who loves you').

The right interpretation of the distance between the referent and its antecedent (locality), and of the level of sentence-embedding of the referent and its antecedent (prominence) seem most important in order to understand different co-referential cohesive relationships.

With respect to relevancy (see 12.2), a communicative contribution is said to be optimally relevant when it is easy for the interviewer to compute the referential connections between old and new information with a minimum of processing effort. This effort on the part of the interviewer can be minimized by the child by establishing clear and simple co-referential relations between words that depict living entities. We limited our analysis to co-referential cohesion between living entities (+animate)\(^{14}\) in order to be able to compare our results to those of Roelofs (1998:115) and others. Thus, the amount of correctly used referent introductions and subsequent mentions is globally indicative of the ability to transmit cohesive and relevant information.

Here, we want to know whether the PI-children show a developmental pattern comparable to that of the N-children with respect to the ability to establish clear cohesion by means of co-reference. And, is there development with age?

In order to answer this question, we first had to compare the PI-children’s referent production (all antecedents plus subsequent mentions) by means of different linguistic devices with that of the N-children. From this analysis it became clear that

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\(^{14}\) We limit our analysis to the cohesive devices used to establish cohesion between living entities (+animate), following Karmiloff-Smith (1979), Bamberg (1987), Kail & Hickmann (1992), Wigglesworth (1990), Aarssen (1996) and Roelofs (1998). In the conversational genre, we excluded I and you (singular) referring to speaker and listener, although these referents play a role in the coding of referent maintenance versus shift.
both N- and PI-children produce a comparable amount of referents. This result resembles earlier results with respect to a comparable amount of noun phrases that was observed in both groups (see 7.4; footnote 17). With age the number of referents linearly increases in the PI-children and is comparable to the increase in the N-children. In combination with earlier results with respect to the amount of NP's that remains stable over time (see 7.4), the increase of referents seems to be mainly caused by an increase of pronominal referents with age in both N- and PI-children.

Although the N-children improve the ability to express clear co-referential cohesive relations between words in the conversational interview genre (Roelofs, 1998), LI-children even at an older age tend to continue to have difficulties in this area (e.g. Adams and Bishop, 1989). We may expect some problems in this area in the PI-children based on earlier findings. For instance, in a pilot-study prior to this study, 13 Dutch-speaking PI-children (six five-year-olds and seven nine-year-olds, recruited from the same psychiatric clinic) produced significantly more unclear referents in the conversational interview genre than the N-children from the STAP-population (Dijkhuis, 1994). With age the ability to establish clear co-referential cohesive relations is expected to improve in both populations.

Referents can be divided into first and subsequent mentions. When subsequently a reference is made to the same entity, this is called referent maintenance. Referent shift on the other hand, is coded when subsequent reference is made to a different entity. Each referent expressed by the N- and PI-children is judged either as being unclear or clear. The amount of clear referents is not only globally indicative for the ability to use cohesive devices, but also for the ability to take into account the interviewer's point of view (De Villiers, 2001a, 2001b).

In the next sections we will present the results with respect to co-referential cohesion, divided into referent introductions (13.5), referent maintenances (13.6) and referent shifts (13.7).

15 ANCOVA with the number of communicative contributions coded for topic as covariate; age effect F(4,164)=4.79, p<0.001. No age*group interaction effect was found (nine-year-old PI-children excluded).

16 ANCOVA (Polynomial contrast) with number of communicative contributions coded for topic as covariate; N-children: F(4,69)=3.10, p<0.021; Linearity: p< 0.018; PI-children: F(5,113)=2.39, p=0.042; Linearity: p<0.001 (nine-year-olds included).

17 An alternative approach is to accentuate the co-referential cohesive relation as being clear as opposed to ambiguous (when a referent refers to two possible antecedents). A negative consequence of this method (Roelofs, 1998), we want to avoid, is that a referent 'he' can be coded as clear if its relationship with the antecedent 'he' is clear, although this antecedent 'he' can have been judged as depicting towards an unclear mental representation of a living entity. We choose to code subsequent mentions 'he' to an unclear antecedent 'he' (?) also as unclear in order to detect unclear pronominal chains, when the same pronoun was used successively. With permission of Roelofs, her data were adjusted on this point.
13.5 Referent Introduction in conversation

13.5.1 Research questions, definitions and operationalisations
The first time an entity is mentioned by the children, the form depends on whether the entity referred to is given (already known) or new (completely new) information for the interviewer (see for more information on this topic Hickmann, 2003). In Dutch, the preferred form for introducing a brand-new entity is an indefinite NP (indefinite article+Noun) in non-subject/focus-position (Aarssen, 1996:93) (Example 8).

Example 8  
First mention by means of an indefinite NP in non-subject/focus position (PI-child; age 5;11)
Robin:  
ik heb een broertje.  
(I have got a brother)

In general, when children rightly presuppose that the first mentioned entity is about shared information (the information is also already known by the interviewer), a definite NP (e.g. possessive pronoun + NP) in subject/topic-position can be used (Example 9).

Example 9  
First mention by means of a definite NP in subject/topic-position (PI-child; age 5;5)
Mandy:  
mijn moeder ligt aan die kant  
(my mother lies on that side)

But, when children wrongly assume that the interviewer knows a certain person by name and therefore use a proper name (= definite NP), the referent is judged as unclear (Example 10).

Example 10  
Unclear first mention by means of a proper name (PI-child; age 5;3/8)
Roel:  
en toen hadden we de vissen bij *Jan, in de vijver gedaan.  
(and then we put the fishes by *Jan, in the pond)

Pronominal reference is the marked form for referent introduction. It can only be used correctly under special conditions, but mostly it leads to unclear referent introductions (Blankenstijn, 1996). In Table 13.5 we give an overview of clear and unclear (*) first mentions.

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18 By using an index, for instance the 'x', in 'the boy, he, walks' we indicate that the pronoun 'he' refers to the same entity 'x' as the NP 'the boy'.

Here, we want to know whether the amount of clear referent introductions expressed by the PI-children is comparable to the amount expressed by the N-children. And, is there comparable development with age? From Roelofs (1998:120) we know that younger N-children produce more unclear referent introductions than older N-children. On the basis of previous research (Dijkhuis, 1994), we may detect more unclear referent introductions and a slower developmental rate in the PI-children.

13.5.2 Results: Referent Introduction in conversation

In the conversational interview genre, the PI-children produced significantly fewer referent introductions than the N-children. This means that the PI-children start to talk about persons or animals they know but the interviewer does not know less frequently than the N-children. This is of no surprise, since we mentioned before (see 11.7 and 12.9) that the PI-children have difficulties in the production of new information.

When we explored how many times the preferred form for referent introductions was used (i.e. indefinite NP in focus-position), the following developmental patterns can be seen: the N-children correctly expressed first mentions by means of an indefinite NP (in 27% of all cases) in subject/topic-position (22%) (see Example 8) and non-subject/focus-position (78%) (see Example 7). In the PI-children the distribution of indefinite NPs (in 31% of all cases) in subject/topic (15%) as opposed to non-subject/focus-position (85%) does not significantly differ from the pattern found in the N-children. Since this pattern is stable over time, we can conclude that from four years of age on, both N- and PI-children figured out that in Dutch indefinite NPs used for referent introductions mostly have no topic function in conversation and are therefore placed in non-subject/focus position.

Next, we explored how many first mentions are semantically/pragmatically marked and unclear. This is the case, when children incorrectly use definite NPs or pronouns in case an indefinite NP is required, resulting in unclear first mentions (= referent introduction) (Figure 13.5).

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19 ANCOVA with the mean total number of all references as covariate. group effect F(1,64)=26.20, p<0.001; age effect F(1,164)=10.60, p<0.0001; no age*group interaction effect was found (nine-year-old PI-children excluded).
From Figure 13.5 we see that the PI-children in the younger age-groups produce fewer unclear referent introductions than the N-children with a turning point at age six. In the older age-groups the PI-children produce slightly more unclear referent introductions than the N-children. However, the differences are too small to observe a significant group effect. With age a linear decrease of unclear referent introductions is found in the PI-children similar to the decrease observed in the N-children (Roelofs, 1998).

The use of proper names, especially by the younger N-children, caused most unclear referent introductions (Roelofs; 1998:120). The PI-children, especially the younger age groups, mainly have difficulties with being explicit (see 5.3 and 5.4). Therefore, they produce fewer first mentions by means of a proper noun and thus make fewer mistakes of this type than the N-children. When the production of these linguistic devices, such as proper names and NP's, increases in the older aged PI-children, they produce relatively more unclear referent introductions than the N-children.

The PI-children expressed more unclear referent introductions (10%-25%) that were caused by morphological/syntactic and/or semantic/pragmatic inappropriateness compared to the N-children (0%-7%). This proved to be a significant group effect. A closer look at the data shows that roughly half of the inappropriate unclear referent introductions are caused by ungrammatical missing subjects (see 5.3) and

20 ANCOVA with the same covariate; N-children: F(4,69)=11.14, p<0.0001; Linearity p<0.001; PI-children (nine-year-old PI-children excluded): no significant linear age effect; PI-children (nine-year-old PI-children included: F(6,113)=3.67, p<0.004, Linearity: p<0.0001.
21 ANCOVA with the number of unclear topic introductions as covariate; group effect: F(1,164)=19.34, p<0.001; No age- or age* group interaction effect was found (nine-year-old PI-children excluded).
objects (see 5.4) or by Determiner-Noun agreement errors in the PI-children (see 7.4). The other half of unclear referent introductions was caused by semantic mismatch (e.g. 'brother' instead of 'friend' or 'she'/he'/it' substitutions). Frequently a clustering of difficulties in both areas causes unclear referent introductions (Example 11).

Example 11 Referential unclarity caused by morphological/syntactic and semantic/pragmatic inappropriateness (PI-child; age 6.5)

Alexander: ik zag een zwart Ø springen.
(1 saw a black Ø jumping).
Paraphrase: I saw a black insect jumping.

What is more, the indefinite NP in subject position is nearly always correctly used by the N-children, but not by all PI-children. Younger PI-children say something N-children hardly ever do, namely 'a brother walks to me' (indefinitive article + N) instead of 'my brother walks to me' (possessive pronoun + N).

13.5.3 Conclusion: Referent Introduction in conversation
In the conversational interview genre, the PI-children produced significantly fewer referent introductions than the N-children. The N- and PI-children (4-8 yrs) produced an equal amount of referent introductions in the preferred form and this amount increased with age. From age four on, the introduction of brand new entities with an indefinite NP seems to be no problem, neither for the N-children nor for the PI-children. However, the N-children learn to express clear first mentions by means of definite NP’s, such as proper names, and pronouns from age six on, whereas the PI-children seem to acquire this ability later. Although no group effect was found in the amount of unclear referent introductions, the use of unclear referent introductions in the PI-children was significantly more often caused by morphological/syntactic and/or semantic/pragmatic difficulties compared to the N-children.

13.6 Referent Maintenance in conversation

13.6.1 Research questions, definitions and operationalisations
As mentioned above (see 13.4), referent maintenance is coded when a subsequent mention is about the same entity as the first mention (Example 12).

Example 12 Referent maintenance (PI-child: age 5.5)

Mandy: we hadden nog een vis,
(we had another fish)
Mandy: maar die hebben we bij onze buren, gebracht.
(but that/ him, we brought to our neighbours)
Mandy: want die was helemaal in zijn eentje.
(because that he, was totally alone)
The first mention of a new entity is 'een vis' (a fish), subsequently mentioned as 'die' (the demonstrative that). No other living entity is mentioned in between, and we coded this instance as referent maintenance. In the referential chain (a fish - that - that) the second that is not coded as referent maintenance, because we and neighbours are mentioned in between. It is coded as a referent shift (see 13.7). With respect to referent maintenance, the first mention or previous mention is called the antecedent ('a fish' is the antecedent of the first 'that'; the first 'that' is the antecedent of the second 'that'). Sentence internal and external reference maintenance both exist in conversation and are called endophoric reference. When established by means of one or more successive pronouns, this is called anaphoric reference (Halliday and Hasan, 1976). In Dutch, referent maintenance by means of a pronominal form (personal pronoun, demonstrative pronoun or zero-pronoun in case of topic-drop and gapping constructions) is the unmarked semantic/pragmatic form (Aarssen, 1996:91).

The most simple referent maintenance constructions occur when antecedent and referent are expressed in the same communicative contribution, such as an NP immediately followed by a support-pronoun (Example 13) or a pronoun followed by a proper name (Example 14).

Example 13 Referent maintenance within one contribution (PI-child: age 5;9)
Tijmen: en opa Japie, die, zag het
(and grandfather Japie, he, saw it)

Example 14 Referent maintenance within one contribution (PI-child: age 5;2)
Interviewer: je hebt nog een broertje?
(you have got another little brother?)
Atilla: ja.
(yes)
Atilla:→ hij, heet Istwan,
(he, is called Istwan)

In Example 14, the PI-child also establishes clear co-referential cohesion by means of the antecedent 'brother' and the referent 'he'. This is another relatively simple and therefore frequently used construction in order to establish referent maintenance by means of an NP in the first and pronoun in the subsequent contributions. In this construction nearly no information (that covers a whole clause) is expressed between referent and antecedent. This is called Minimal Distance Strategy (e.g. Aarssen, 1996; Roelofs, 1998; see 13.6.2).

When children try to establish clear referent maintenance not following the Minimal Distance Strategy, this is supposed to be more difficult, especially when a non-animate entity is mentioned in between (Example 15).
Example 15  Clear referent maintenance with more information in between; conversational topic: pet-animals run in running mill (PI-child; age 5;11)

Julien:  dan gaan ze, door dat draaiding spelen.
         (then they, go playing through that turning thing)
Julien:  want hij is wel dik, dat ding.
         (because he is thick that thing)
Interviewer:  wat is dik?
            (what is thick?)
Julien:  nou, zo'n draaiding.
            (well, such a turning thing)
Julien:→  daar lopen ze.
            (there they, walk)

In Example 15, the PI-child succeeds in establishing clear referent maintenance between the referent 'they' in the last contribution and the 'they' in the first contribution with three contributions mentioned in between.

The development of T-unit-internal and T-unit-external anaphoric reference does not necessarily follow the same path (e.g. Koster, 1993:3). In case of T-unit-external pronominal reference maintenance, relatively more linguistic information can be said between the antecedent and its referent than in case of T-unit-internal pronominal reference maintenance. Then the information between referent and antecedent is not more than one T-unit. In case of T-unit-external pronominal reference maintenance relatively more computation effort seems therefore to be required based on all underlying executive functions Motivation, Attention, Memory and Coherence (see 2.3.1).

In Table 13.6 we give an overview of the forms coded as clear or semantically/pragmatically inappropriate, coded as unclear (*) or too clear (*) referent maintenance. The form coded as clear is dependent on the form used to express the first mention.
Table 13.6  The coding categories co-referential cohesion: referent maintenance

<table>
<thead>
<tr>
<th>First mention</th>
<th>Referent Maintenance (given information)</th>
</tr>
</thead>
<tbody>
<tr>
<td>definite NP</td>
<td>*definite NP pronoun (too clear)</td>
</tr>
<tr>
<td></td>
<td>*proper name (unclear, unless naming-verb is used)</td>
</tr>
<tr>
<td></td>
<td>*indefinite NP (unclear)</td>
</tr>
<tr>
<td></td>
<td>*zero-pronoun (unclear, unless in verb-gapping or topic-drop construction)</td>
</tr>
<tr>
<td>indefinite NP</td>
<td>definite NP pronoun (unclear, unless naming-verb is used)</td>
</tr>
<tr>
<td></td>
<td>*proper name (unclear)</td>
</tr>
<tr>
<td></td>
<td>*indefinite NP (unclear)</td>
</tr>
<tr>
<td></td>
<td>*zero-pronoun (unclear, unless in verb-gapping or topic-drop construction)</td>
</tr>
<tr>
<td>pronoun</td>
<td>definite NP pronoun (too clear, unless a great deal of information in between)</td>
</tr>
<tr>
<td></td>
<td>*proper name (unclear, unless naming-verb is used)</td>
</tr>
<tr>
<td></td>
<td>*indefinite NP (unclear)</td>
</tr>
<tr>
<td></td>
<td>*zero-pronoun (unclear, unless in verb-gapping or topic-drop construction)</td>
</tr>
</tbody>
</table>

When the child uses an NP where a pronoun would have been better, following the nominal strategy (e.g. Bamberg, 1987), redundancy is not reduced and the referent is coded as *too clear* (Example 16).

**Example 16**  Referent maintenance coded as *too clear* (PI-child; age 6;0)

Interviewer: slaap jij met je oudste broer, op zolder?
(do you sleep together with your eldest brother, in the attic?)
Marcel: ja.
(Yes)
Marcel: maar me broer, slaapt dermaal
(but my brother, sleeps next to it)
Paraphrasis: but he, sleeps in a room next to me

Furthermore, a zero-pronoun22 is only clearly used to establish referent maintenance in a gapping construction ('he, ate an apple and Ø, spit the pips out') or in case of topic-drop (Example 17) (see also 5.3, 5.4 and 8.4).

**Example 17**  Correctly used zero-pronoun in a topic-drop construction to establish referent maintenance (PI-child; age 8;10)

Christiaan: maar niemand hoeft op hem, te passen.
(but nobody has too look after him)
Christiaan: Ø, kan wel alleen thuis blijven.
(Ø, can stay at home alone)

---

In sum, the form used to establish referent maintenance is highly dependent on the position in the sentence (topic-position), the verbal constructions used (gapping), the semantic meaning of the verb (such as naming verbs), the forms of other co-referential relationships used in the same successive contributions (Examples 15) and the form in which the antecedent is expressed, like its number and gender (e.g. Grober, Beardsley and Caramazza, 1978) or the determiner used (e.g. definite/indefinite article). Thus, morphological/syntactic and semantic/pragmatic abilities play a large role in the ability to maintain reference.

Here, we want to know whether the PI-children are as good as the N-children in the ability to establish clear referent maintenance. And, do they show a similar developmental pattern with age? In Dutch, a pronoun is the unmarked coding for referent maintenance. It might be expected that this preference will become more salient with age in both N- and PI-children, although we might detect a slower developmental rate in the PI-children.

13.6.2 Results: Referent Maintenance in conversation

First, the differences in the production of referent maintenances by means of an NP by the N- and PI-children proved to be insignificant (Figure 13.6). We see that the percentage of referent maintenances by means of an NP proved to be low to extremely low in the conversational interview genre, but significantly lower in the PI-children (2% to 8%) compared to the N-children (3% to 14%). The N-children produce significantly more too clear nominal referent maintenances, i.e. both antecedent and referent are expressed by a definite article+ NP, than the PI-children. This is of no surprise, because the N-children in general proved to be relatively more explicit than the PI-children, for instance, by expressing more lexical verbs, obligatory subjects/objects, prepositions and adverbs (see 5.2 to 5.7).

There is a linear decrease with age in the number of referent maintenances by means of an NP in both PI-children and N-children. Thus, in the conversational interview genre, the N- and PI-children learn with increasing age to use pronouns instead of NP's (together 100%) as the preferred cohesive device to establish referent maintenance over a number of two or more subsequent communicative contributions. From age four, in the PI- and N-population no children could be detected that solely use NP's for reference maintenance. From that age on both PI-and N-children start to use most frequently pronouns instead of NP's for referent maintenance.

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23 ANCOVA with the number of referent maintenances as covariate; group effect: F(1,164)=13.11, p<0.001 (nine-year-old PI-children excluded).

24 ANCOVA (Polynomial contrast) with the number of referent maintenances as covariate; N-children: F(4,69)=3.71, p<0.009; Linearity: p<0.001; PI-children: F(5,113)=4.20, p<0.002; Linearity: p<0.0001 (nine-year-old PI-children included).
The use of cohesive devices

Figure 13.6 The percentage referent maintenance by means of an NP calculated over all referent maintenances expressed by 75 N-children (Roelofs, 1998) and 120 PI-children in conversation

In contrast to the most preferable and unmarked pronominal form for referent maintenance over a relatively short distance, the unmarked form in Dutch to establish referent maintenance over a relatively large distance is by means of a definite NP. A possible explanation for the fact that PI-children produce significantly fewer referent maintenances by means of definite NP than the N-children, can be found in the fact that in interviews with PI-children the distance between referent and antecedent is greater in the N-children than in the PI-children (Table 13.7).

Table 13.7 The percentage referent maintenance over a relatively short distance and over a relatively long distance (calculated over the mean total number of referent maintenances) in 75 N-children and 100 PI-children in conversation

<table>
<thead>
<tr>
<th>Distance between referent and antecedent</th>
<th>N-children n=75</th>
<th>PI-children n=100</th>
</tr>
</thead>
<tbody>
<tr>
<td>relatively short distance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) within one clause</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>(2) between two clauses</td>
<td>71%</td>
<td>76%</td>
</tr>
<tr>
<td>relatively long distance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>one or more clauses in between</td>
<td>14%</td>
<td>8%</td>
</tr>
</tbody>
</table>

Referent maintenance over a relatively short distance is defined as (1) the referent and its antecedent are both within one clause or (2) the antecedent is in the previous clause and its referent in the next clause. Referent maintenance over a relatively long...
distance is defined as that (3) one or more clauses are between the antecedent and its referent. It can be said that the greater the distance between the referent and its antecedent, the greater the demands made upon the child's short-term-memory. Looking at the distance between the referent and its antecedent, the PI-children produce significantly fewer instances in which the antecedent is more than one clause removed from the referent. This result indicates that the PI-children are slightly delayed in establishing referent maintenance over a relatively larger distance compared to the N-children.

We also explored whether there are qualitative differences in the ability to correctly/clearly maintain reference between two clauses. Here we explored in how many cases the thematic subject strategy (also called parallel function strategy) was used as opposed the minimal distance strategy (Sheldon, 1974; Karmilloff-Smith, 1981; Bamberg, 1986; Aarsen, 1996; Roelofs, 1998:146) in order to establish clear coreferential cohesion.

In Dutch, when children use the thematic subject strategy in conversation, they establish referent maintenance by producing two or more successive clauses with a default surface-word order in which the subject/agent precedes the verb, and the antecedent and referent(s) (mostly personal pronouns) are both in subject/agent/topic position. When children use the minimal distance strategy, they establish referent maintenance by producing two successive clauses in which the antecedent in the first contribution is in focus-position (at the end of the clause/right-sided) and the referent in the second contribution, mostly a demonstrative pronoun, is in topic/agent/subject position with minimal distance between antecedent and referent (Example 18).

Example 18  Two instances of the application of the minimal distance strategy (PI-child; age 5;11)

Gerrit:    wij hebben buren,
           (we have got neighbours)
Gerrit: →  die, hebben hondjes,
           (these, have dogs)
Gerrit: →  die, mogen wij uitlaten
           (these, we may take for a walk)

25 ANOVA; group effect: F(1,165)=23.26, p<0.001; no age effect or age*group interaction effect is observed (nine-year-old PI-children excluded).
Mostly, when the minimal distance strategy is followed, the referent in non-subject-position in the first contribution is the antecedent of the maintained referent in the second contribution in subject position

\[
\begin{align*}
(1) & \quad X_{\text{thematic subject}} \quad Y_{\text{minimal distance}} \\
(2) & \quad Y_{\text{subject}} \quad X_{\text{thematic subject}} \\
\end{align*}
\]

The thematic subject strategy seems to be more complex than the minimal distance strategy, because more language material has to be stored and expressed between referent and antecedent.

\[
\begin{align*}
(1) & \quad X_{\text{thematic subject}} \quad Y_{\text{thematic subject}} \\
(2) & \quad Y_{\text{thematic subject}} \quad X_{\text{thematic subject}} \\
\end{align*}
\]

We only counted thematic subject strategy or minimal distance strategy (1) when antecedent and referent, mostly personal pronouns, were mentioned in two successive clauses and (2) when both the antecedent and referent were judged as being both absolutely clear. Here, we explore whether the amount of parallel function/thematic subject strategy and minimal distance strategy used by the PI-children in order to establish clear co-referential cohesion is comparable to the N-children. And, is there comparable development with age?

From Table 13.8 we see that the PI-children use the thematic subject strategy fewer times and the minimal distance strategy more times than the N-children. These differences, however, are too small to observe a significant group effect with respect to both strategies.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n=75)</td>
<td>(n=120)</td>
</tr>
<tr>
<td>thematic subject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>minimal distance</td>
<td>2.1</td>
<td>2.8</td>
</tr>
<tr>
<td>thematic subject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>minimal distance</td>
<td>4.1</td>
<td>7.2</td>
</tr>
</tbody>
</table>

26 ANCOVA with the number of referent maintenances as covariate; Thematic subject strategy: age effect \(F(4,164)=4.63, p<0.03\); Minimal distance strategy: age effect \(F(4,164)=3.20, p<0.015\) (nine-year-old PI-children excluded).
Both age effects proved to be significant, although not linear. Before age seven, both strategies increase in both N- and PI-children. This indicates that in the school-aged children the ability to establish clear referent maintenance by both strategies improves. We see a turning-point between seven and eight years. At that time the minimal distance strategy decreases in favour of the thematic subject strategy, indicating that from age seven on N- and PI-children learn to use the more complex form of clear pronominal referent maintenance between clauses. The nine-year-old PI-children show that the use of the thematic subject strategy will increase beyond age eight/nine. The Dutch-speaking PI- and N-children in all age groups mainly use personal pronouns with the thematic subject strategy as opposed to demonstrative pronouns whith the minimal distance strategy.

As mentioned above (Figure 13.6), N- and PI-children maintain reference mainly by using the preferred form that is a pronoun. This seems not to be influenced by its sentence position, its distance (between antecedent and pronominal referent) and the strategy used. As expected, the amount of pronominal referent maintenances increases with age: in the N-children from 86% to 97% and in the PI-children from 92% to 98% (see Figure 13.6: NP maintenance + pronoun maintenance = 100% maintenance). By pronominal reference, however, the chance to become unclear is increased compared to NP referent maintenance. Here, we want to explore whether the amount of clear pronominal referent maintenances in the PI-children is comparable to the N-children. And, is there comparable development with age?

In Figure 13.7 we present the percentage unclear pronominal referent maintenance, making no differentiation in distance between antecedent and referent. We see that the PI-children produce significantly more unclear pronominal maintenances than the N-children. The N-children in contrast hardly produce unclear pronominal maintenances in the conversational interview genre from an early age. We see that the nine-year old PI-children improve, but still do not quite reach the level found in the seven- and eight-year-old N-children. Relatively many unclear referent maintenances are caused by morphological/syntactic (MS) and/or semantic/pragmatic (SP) inappropriateness. This is significantly higher in the PI-children (18% to 56%) than in the N-children (0% to 7%). The PI-children have more problems than the N-children in choosing the right morphological/syntactic form or semantic/pragmatic content. For instance, the PI-children, even in the older age groups, still have difficulties in applying marking rules for gender (e.g. 'boy' is referred to with 'he', not with 'she'), number (e.g. 'boys' is not referred to with 'he', but with 'they') and verb agreement between referent or antecedent (e.g. '*boys eats

---

27 Dutch is different from English in the forms that can be used in both types of strategies. In English the selection of independent demonstrative pronouns seems relatively more restricted than in Dutch.

28 ANCOVA with the number of all referent maintenances as covariate; group effect: F(1,164)=74.20, p<0.0001; no age- or age*group interaction effect was observed (nine-year-old PI-children excluded).

29 ANOVA over percentages; group effect: F(1,165)=54.67, p<0.0001; no significant age- and age*group interaction effects are observed (nine-year-old PI-children excluded). Because of small numbers, the ANCOVA could not be used.
The use of cohesive devices

and Ø drink\(^\ast\) (see 7.3 and 7.4). The PI-children also use a zero-pronoun that leads to unclear referent maintenance more frequently than the N-children (see 5.3).

Figure 13.7

The percentage unclear pronominal referent maintenances calculated over the total number of referent maintenances per age group expressed by 75 N-children and 120 PI-children in conversation

![Graph showing percentage unclear pronominal referent maintenances for N-children and PI-children across age groups.]

13.6.3 Conclusion: Referent Maintenance in conversation

Although the PI-children produce a comparable amount of referent maintenances compared to the N-children, there are some qualitative differences. First, the PI-children produce significantly fewer referent maintenances where more than one clause is expressed between the antecedent and the referent compared to the N-children. This may be related to the PI-children's tendency to limit their linguistic short term memory load. This tendency may, in turn, be related to executive (memory) dysfunctioning (see 2.3.1). This idea is not undisputable; when we look at the strategies used for clear pronominal referent maintenance between two clauses, the PI-children followed the thematic subject-strategy, this being the most complex strategy, more than the minimal distance strategy. The PI-children are thus comparable in this respect to the N-children.

Second, the N-children produce significantly more too clear nominal referent maintenances, whereas the PI-children produce significantly more unclear pronominal referent maintenances; a substantial percentage is caused by morphological/syntactic and/or semantic/pragmatic inappropriateness. This is hardly ever the case in the N-children. In cases of uncertainty, the N-children choose to be as explicit as possible as opposed to the PI-children, who tend to be rather implicit and thus vague.

In sum, this result confirms that PI-children as a group have difficulties in establishing clear co-referential cohesion by means of pronominal referent maintenances. Instances of unclear pronominal reference were significantly more
frequently caused by morphological/syntactic and/or semantic/pragmatic errors in the PI-children than in the N-children.

13.7 Referent Shift in conversation

13.7.1 Research questions, definitions and operationalisations

As mentioned before, referent shift is coded when a subsequent mention is about another entity than the previous one. To establish clear co-referential cohesion by means of referent shifts is the most difficult, complex form of reference compared to referent introductions and maintenances. In case of referent shifts we also have to deal with endophoric reference (Halliday and Hasan, 1976), which is one of the possibilities to establish co-referential cohesion. In Example 19, nearly identical to Example 12, referent shifts are underlined.

Example 19 Referent shifts (PI-child: age 5;5; last contribution fictive)

Mandy: we, hadden nog een vis.
Mandy: maar die hebben we, bij onze buren, gebracht.
Mandy: want die was helemaal in zijn eentje.
Mandy: and our neighbours, have more fishes to look after (fictive)

From Example 19, we see that referent shifts can be made by an indefinite NP (‘a fish’ in the first contribution follows ‘we’, which refers to other entities). Its use, however, has to be differentiated from the first mention of a new entity (‘a fish’ in the first contribution). First mentions are always coded as referent introduction. Only subsequent mentions can be coded as referent shift.

Next, a referent shift can be made by a pronoun, like the second we that leads to clear co-referential cohesion. And, a referent shift can be made by using a definite NP, like our neighbours. In Dutch, a definite NP can be seen as the unmarked coding for a referent shift. We expect that this preference will become more salient across age groups (Aarssen, 1996:91). Pronouns can also be used, but they are more complex, since the use of pronouns is dependent on more semantic/pragmatic rules and thus may increase the chance of being unclear (see Table 13.9).

In Table 13.9, we present the forms that can be used in order to establish clear co-referential cohesion for referent shifts. We set out the possibilities for two entities ‘x’ and ‘y’ in the discourse. Subsequent forms can ‘rule each other out’, because they lead to lack of clarity. For instance, after the successive four contributions ‘he liked him’, ‘but he did not like him’, ‘once he hit him’, ‘and now he does not like him too’, both pronominal referents are no longer immediately clear without some extra computational effort. One of the sentence-external binding rules for establishing clear pronominal referent shifts is, for instance, that when ‘x’ and ‘y’ have the same semantic gender, the one can be referred to by means of a pronoun, but the other
The use of cohesive devices

must be referred to be means of a NP in order to stay clear (Blankenstijn, 1996). It was noticed, that only sophisticated adult speakers seem to have overcome this problem by using lexical verbs that can raise possible difficulties in clear pronominal referent shifts when referring to two entities of the same gender.

Table 13.9  The coding categories of co-referential cohesion: referent shift

<table>
<thead>
<tr>
<th>previous mention&lt;sub&gt;x&lt;/sub&gt;</th>
<th>previousmention&lt;sub&gt;y&lt;/sub&gt;</th>
<th>Referent Shift&lt;sub&gt;x&lt;/sub&gt;</th>
<th>Referent Shift&lt;sub&gt;y&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>definite/ indefinite NP</td>
<td>definite/ indefinite NP</td>
<td>definite NP</td>
<td>definite NP</td>
</tr>
<tr>
<td>* indefinite NP</td>
<td>* indefinite NP</td>
<td>* indefinite NP</td>
<td>* indefinite NP</td>
</tr>
<tr>
<td>* zero (only if: gapping/topic drop)</td>
<td>* zero (only if: gapping/topic drop)</td>
<td>* zero (too clear)</td>
<td>* zero (too clear)</td>
</tr>
<tr>
<td>pronoun</td>
<td>definite NP</td>
<td>pronoun</td>
<td>definite NP</td>
</tr>
<tr>
<td>definite NP</td>
<td>pronoun</td>
<td>if x ≠ y in gender &amp; number</td>
<td>if x ≠ y in gender &amp; number</td>
</tr>
<tr>
<td>pronoun</td>
<td>* pronoun</td>
<td>* pronoun</td>
<td>* pronoun</td>
</tr>
<tr>
<td>if x=y in gender &amp; number</td>
<td>if x=y in gender &amp; number</td>
<td>if x=y in gender &amp; number</td>
<td>if x=y in gender &amp; number</td>
</tr>
</tbody>
</table>

It is not difficult to imagine that establishing clear referent shifts is even more difficult than to establish clear referent maintenances. In the case of referent shifts, there is always a linguistic context in which the child is talking about more than one living entity at the same time, whereas in case of referent maintenance this is usually not the case. The ability to establish clear referent shifts may therefore be a later development at a slower rate compared to the development of referent introductions and referent maintenances. The ability to establish clear referent shifts may therefore still develop beyond age eight. Here, we want to know whether the amount of clear referent shifts expressed by the PI-children is comparable to the amount expressed by N-children. And, do they show a comparable developmental pattern with age?
13.7.2 Results: Referent Shift in conversation
The number of referent shifts per interview (N-children: 14; PI-children: 18) is in both populations lower than the production of referent maintenances (N-children: 20; PI-children: 20). This means that in the conversational interview genre, the N- and PI-children mostly talk about one living entity instead of two or more entities per contribution. The only exception is when children refer to themselves (mostly with 'I') and to the interviewer (with 'you').

Unexpectedly, the number of referent shifts in the PI-children proved to be significantly higher than in the N-children. The reason may be that the PI-children use the strategy of topic shading, moving from one conversational topic to the other, triggering referent shifts, more frequently than the N-children (see 12.1).

We explored the ratio between definite NP as opposed to pronoun shifts. Referent shift by means of a definite NP is the semantically/pragmatically unmarked coding. From Figure 13.8 we see that the PI-children (total mean: 43%) use a definite NP less than half of the time and the N-children half of the time (total mean: 51%). The PI-children produce NP referent shifts significantly less often than the N-children. Thus, the N-children are doing better than the PI-children. With age definite NP shifts decrease in both N- and PI-children.

Figure 13.8 The percentage referent shifts by means of a definite NP calculated over all referent maintenances expressed by 75 N-children and 120 PI-children in conversation

![Graph showing the percentage of referent shifts by means of a definite NP](image)

30 ANCOVA with the number of all referents as covariate; group effect: F(1,164)=11.42, p=0.001; no age- or age*group interaction effect was found (nine-year-old PI-children excluded).

31 ANCOVA with the number of all referent shifts as covariate; group effect: F(1,164)=6.65, p<0.04; age effect F(4,164)=4.36, p<0.002; no age*group interaction effect was observed (nine-year-old PI-children excluded).
When pronominal shifts are used, the chances that these shifts are unclear increase (Figure 13.9). Unexpectedly, no significant group effect was found. With age the percentage unclear pronominal referent shifts decreases. We see that the four-year-old PI-children produce very many, the five- and six-year-olds relatively few and the older PI-children produce again relatively many unclear pronominal shifts compared to same-aged N-children.

**Figure 13.9**  The percentage unclear pronominal referent shifts (calculated over the total number of referent pronominal shifts) per age group expressed by 73 N-children and 120 PI-children in conversation

<table>
<thead>
<tr>
<th>Age</th>
<th>N-chi % unclear pronominal shifts</th>
<th>P-chi % unclear pronominal shifts</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 yrs</td>
<td>33</td>
<td>56</td>
</tr>
<tr>
<td>5 yrs</td>
<td>33</td>
<td>23</td>
</tr>
<tr>
<td>6 yrs</td>
<td>23</td>
<td>20</td>
</tr>
<tr>
<td>7 yrs</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>8 yrs</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>9 yrs</td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

In the conversational interview genre, relatively many pronominal shifts are clear and thus correct (N-children: 67% to 90%; PI-children: 44% to 84%). This may be explained by the fact that both N- and PI-children often talk about themselves, using the personal pronoun 'ik' (I), or they talk about themselves being part of the family or a group of friends, using the personal pronoun 'we' (we) in topic-position. Referent shifts in focus-position to other entities than themselves are more easy to manage, keeping the first person singular/plural referent (I/we) constant (Example 20).

**Example 20**  Clear pronominal referent shifts (PI-child: age 8.2)

Tanja: vanochtend had ik zin om mijn konijn te knuffelen.
       (in the morning I wanted to hug my rabbit)
Tanja: toen pakte ik, de konijn uit de hok
       (then I picked her up out of her hutch)

In Example 20, the PI-child correctly uses two clear pronominal shifts in two successive contributions. PI-children as young as four can do this, when both

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32 ANCOVA with the mean total number of reference pronominal shifts as covariate; age effect: F(4,164)=3.70, p<0.007; no age*group interaction effect was observed (Nine-year-old PI-children excluded)
contributions are very simple in argument and thematic role structure. The use of the thematic subject strategy used in order to establish cohesive pronominal shifts has to be further explored in the future.

When taking into account all linguistic devices used for referent shifts, we observe that the PI-children (15% to 55%) produce significantly more unclear referent shifts than the N-children (0% to 7%) caused by morphological/syntactic and/or semantic/pragmatic inappropriateness. This proved to be a significant group effect. With age no linear decrease is observed. A closer look at the data shows that especially when older PI-children try to produce morphologically/syntactically and semantically/pragmatically more complex contributions, these contributions frequently were judged as ungrammatical or semantically/pragmatically marked compared to those of the same-aged N-children.

13.7.3 Conclusion: Referent Shift in conversation
The PI-children produce more referent shifts compared to the N-children, although both groups of children produce referent shifts (more complex) less frequently than referent maintenances (less complex). The PI-children produce significantly fewer shifts by means of a definite NP and more shifts by means of an indefinite NP (always unclear) or a (zero) pronoun (increasing the chance of being unclear). The PI-children as a group do not produce more unclear pronominal shifts. However, when they refer unclearly, this was significantly more frequently caused by morphological/syntactic and/or semantic/pragmatic inappropriateness compared to the N-children.

13.8 General conclusions: the ability to transmit relevant information: the ability to use cohesive devices
In general, we can conclude that the PI-children are not as good as the N-children in using clausal ellipsis, con/subjunctions and co-referential devices to establish clear cohesive linkages between communicative contributions.
First, the PI-children use more clausal ellipsis and make significantly more semantically/pragmatically incorrectly used clausal ellipsis constructions compared to the N-children. Second, the PI-children are not as good as the N-children in the use of conjunctions and subjunctions (calculated over all communicative contributions) in order to establish cohesion. The PI-children use significantly fewer co-ordinating and subordinating conjunctions, and make significantly more mistakes compared to N-children.
Third, with respect to co-referential cohesion, we see that the PI-children produce significantly more unclear referents than the N-children (Figure 13.10). With age

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33 ANCOVA with the number of all unclear referent shifts as covariate; group effect F(1,164)=37.01, p< 0.0001; No age or age*group interaction effect was observed (nine-year-old PI-children excluded).
34 In section 8.5.2 the number of embedded clauses produced by the N- and PI-children proved to be comparable.
35 ANCOVA with the mean total number of references as covariate; group effect F(1,164)= 16.62, p=0.001; age effect (F(4,164)=7.50, p<0.0001); no age*group interaction effect was observed (nine-year-old PI-children excluded).
there is a linear decrease in the production of unclear referents in both groups, although at a higher rate in the N-children than in the PI-children.

Figure 13.10  The percentage unclear referents (calculated over all referents) per age group expressed by 75 normally developing children and 120 PI-children in conversation

![Graph showing percentage unclear referents per age group for N-children and PI-children.]

We have the impression that there exists great individual variation within age groups and within the N- and PI-group: some children are doing far better than others. Therefore, we decided to look in more detail at the PI-children who produce extremely many unclear referents (Table 13.10).

Table 13.10  Distribution of the number of N-children per age-group (n=15) and the number of PI-children per age-group (n=20) and the total number and the percentage of N-children (n=75) and PI-children (n=120) categorized according to z-scores ≥+1 and +2 on the variable unclear referents in conversation

<table>
<thead>
<tr>
<th>Unclear referents</th>
<th>N-children n=75</th>
<th>PI-children n=120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>z ≥ +1</td>
<td>z ≥ +2</td>
</tr>
<tr>
<td>4 yrs</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5 yrs</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>6 yrs</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7 yrs</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8 yrs</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>9 yrs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>(8 %)</td>
<td>(9 %)</td>
</tr>
</tbody>
</table>

There are significantly more PI-children than N-children that produce extremely unclear referents falling in the marked category z≥+2. When we take both

36 ANCOVA (Polynomial contrast): N-children: age effect F(4,69)=9.59, p<0.0001; Linearity: p<0.0001; PI-children (nine-year-old PI-children included): age effect F(5,113)=6.95, p<0.0001; Linearity: p<0.0001; Cubic: p=0.012).
Chapter 13 Semantic/Pragmatic conversational development

marked categories ($z^\geq+1$ and $z^\geq+2$) together, we see that significantly more PI-children ($n=52$) than N-children ($n=13$) produce too many unclear referents. Thus, there are more individual PI-children than N-children that show a disability in the establishment of clear co-referential cohesion.

We observed that the introduction of brand-new entities with an indefinite NP in topic-position is no problem, neither for the N-children nor for the PI-children. They both have more problems with first mentions by means of definite NP's (e.g. proper name) and pronouns. Whereas the N-children learn to use these devices more clearly by age, the PI-children show the same development, although at a slower rate. Next, the PI-children produce significantly fewer too clear referent maintenances by means of a definite NP and significantly more unclear pronominal referent maintenances compared to the N-children. Moreover, the PI-children produce significantly fewer referent maintenances whereby more than one clause is produced between the antecedent and the referent as compared to the N-children. We argued that the PI-children are slightly delayed in the establishment of referent maintenance over a larger distance compared to the N-children. Furthermore, the PI-children's productivity of referent shifts is relatively low and comparable to that of the N-children, whereby the percentage unclear shifts is comparable in both groups. The PI-children have difficulties in establishing clear cohesive relations between language units by means of clausal ellipsis, the use of conjunctions and subjunctions, and by means of all types of co-referential cohesion compared to the N-children. We showed that these semantic/pragmatic difficulties in the PI-children were for a substantial part related to difficulties in the area of morphology/syntax. The PI-children frequently miscalculate the listener's informational needs and miss the right content to establish cohesion. In particular the PI-children are frequently also lacking the right linguistic morphological/syntactic form to establish clear cohesion (e.g. Johnston, 1985; Bishop and Adams, 1989). These difficulties are a good indication of a language disorder, predominantly in the area of semantics/pragmatics, although many of these cohesive difficulties are closely related to difficulties in the area of morphology/syntax. The PI-children gave the impression that, while they are in the process of learning to apply certain semantic/pragmatic rules, they were still suffering from not having developed the right morphological/syntactic tools to work with.

37 Chi-square (after continuity correction) = 9.60, df = 1, p< 0.002 (nine-year-old PI-children included).

38 Chi-square (after continuity correction) = 1.89, df = 1, p< 0.0001 (nine-year-old PI-children included).