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The ability to transmit relevant information

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12.1 Introduction
In the previous chapters, we described the PI-children's semantic/pragmatic (dis)abilities with respect to turn taking abilities at the structural level (Chapter 10) and at the functional level, mainly with respect to responsiveness (Chapter 11). In the following three chapters, we will explore the ability to transmit relevant information at the content level (Sperber and Wilson, 1986).

The issue of 'what is relevant information' is difficult and complex. It can be said, however, that relevance is, among other things, dependent on the intelligibility of the implicit and explicit semantic relationships between and within communicative contributions. Thus, in the conversational interview genre, a contribution is optimally relevant when it is easy for the interviewer to understand the connections between the old and the new information with a minimum of processing effort. This effort can be minimised by the child by making the form and content of the contribution as clear as possible (e.g. Sperber and Wilson, 1986). Ideally, both children and interviewer are trying to maximize relevancy. In the course of their development, children have to learn what information is relevant in many different communicative situations, taking into account the listener's point-of-view. In everyday life, the environment or the situation is of great influence on what is relevant (to do or say) next. In the interview-situation the influence of environmental factors is reduced. Only what is said in the interview is of influence on what is relevant to say next.

In general, two aspects that play a part in the linking of communicative contributions are distinguished, namely coherence and cohesion. Coherence is the semantic connection between contributions that involves some knowledge of the world for its interpretation. Cohesion is the semantic connection between linguistic elements when the interpretation of the meaning of one linguistic element is dependent on another linguistic element in the same contribution or beyond (e.g. Renkema, 1993). The contributions that are semantically most closely connected, are related to one conversational discourse topic (Brown and Yule, 1983; Schober-Peterson and Johnson, 1993). Usually, conversational topics change gradually over time, so that two successive turns of talk are related to one another, but communicative contributions three or four turns apart might be on different topics (e.g. Ninio and Snow, 1996). In the conversational interview genre, the amount of coherently and cohesively linked contributions that add new information to the conversational topic is seen as globally indicative for the ability to be relevant (e.g. Grice, 1975; Brown and Yule, 1983).

We expect that children will improve their semantic/pragmatic ability to transmit relevant information. Ideally, both children and interviewer try to make a clearly coherently and cohesively linked whole from a given sequence of contributions. Coherence and cohesion thus largely depend on the co-operation between
participants. To do this, a fine-tuning mechanism is required that involves taking into account each other's point-of-view and knowledge of the world. Children have to acquire these abilities that are part of their development of a Theory-of-Mind (ToM) (see 2.3.3). On the basis of the developmental literature (e.g. Cohen, Kershner and Wehrspan, 1985; Cohen et al., 1998; Vallance, Im and Cohen, 1999), we expect that most PI-children will have difficulties to transmit relevant linguistic information that requires such fine-tuning mechanisms. Here, we want to explore whether the PI-children have difficulties in this area compared to the N-children.

For this semantic/pragmatic analysis, we used the model for topic management (Roelofs, 1996), the model for coherency (Roelofs, 1996) and the model of cohesion (Blankenstijn, 1996; Roelofs, 1996; Scheper, 1996). According to the model for topic management, for instance, the amount of topic continuations can be scored. According to the model of coherency, it is possible to judge whether or not children follow the semantic/pragmatic rules for co-operativeness, according to the different Maxims as defined by Grice (1975). When communicative contributions are not coherently linked to the ongoing conversation, they can be judged as a violation of one of these Maxims. According to the model of cohesion, it is possible to judge whether contributions are appropriately cohesively linked by the use of different linguistic means, as will be described in more detail in Chapter 13.

In the following, we will first describe the PI-children's ability to manage the conversational topic (12.2). We will then explore their ability to be coherent by following the Maxims of Grice (1975) (12.3) divided into the Maxim of Relation (12.4), the Maxim of Relevance (12.5), the Maxim of Quantity (12.6 and 12.7) and the Maxim of Quality (12.8), and we will end with the general conclusions with respect to the ability to transmit relevant information (12.9).

12.2 Topic Management

12.2.1 Research questions, definitions and operationalisations

Here, we will focus on the development of the ability to manage the conversational topic. Successful participation in the interview requires that children not only understand the questions asked and identify the main information asked for, but also formulate a topic-related response. When children discuss certain topics in detail, they should link successive communicative contributions coherently and cohesively. By giving intelligible, new and thus relevant information, covering one topic in extended discourse with a narrative character (see 11.5), children influence the quality of the interview positively. Thus, the amount of topic continuations per interview expressed by children has a positive influence on the quality of the interview.

School-aged children have to acquire the ability to continue a certain conversational topic with minimal support, like telling jokes or funny anecdotes at the dinner table. In more competitive situations, where others want to interrupt, children also have to acquire the ability to maintain their conversational topic. This is seen as an area of
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major development during the school years (Ninio and Snow, 1996). Previous research (Roelofs, 1998) showed that in the older Dutch-speaking N-children, the ability to link contributions between and within conversational topics, e.g. the ability to manage the conversational topic in the interview genre, improved. This development is comparable to earlier reports with respect to English-speaking N-children (Brinton and Fujiki, 1984; Hoff-Ginsberg, 1987; Adams and Bishop, 1989; Schober-Peterson and Johnson, 1993).

Some reports have shown that LI-children have difficulties in topic continuation and management (Fey and Leonard, 1983; Johnson, Johnston and Weinrich, 1984; Van den Dungen and Verboog, 1993; Craig and Evans, 1993), although others do not (Rosinski-McClendon and Newhoff, 1987). LI-children have been reported to keep the conversation going on familiar topics, thus avoiding complex topics, unfamiliar vocabulary areas etc. (e.g. Bishop and Adams, 1989). However, little is known about the relative speed of this development and the kind of deficiencies in PI-children. In PI-children with an internalizing disorder additional difficulties have been found with topic management, i.e. the ability to introduce, maintain and continue topics by adding new information (Valance, et al., 1999).

Here, we will explore the ability to manage the conversational topic by the PI-children compared to the N-children. But first, it is important to consider how far differences in interview style between the N-interviewer and PI-interviewers may have influenced the conversational behaviours to be described here (e.g. Bishop et al., 2000).

Differences in interview style

When different speakers co-operate, the conversational topic is developed equally by them depending on their personal interests and underlying goals in the conversation. Mostly this leads to a systematic structuring of conversational topics (Ochs-Keenan & Schieffelin, 1979; Levinson, 1983). In the conversational interview genre, the situation is unbalanced. Since it is the interviewer's task to elicit language from the children, they try to follow the children as much as possible in their development of conversational topics, but take over as soon as the children have nothing more to say by asking further questions or elaborating on responses (Schley and Snow, 1992). Thus, whenever children willingly and spontaneously respond by extended discourse, the interviewers keep silent and support the children only by feedback (see 11.1). This is in accordance with the STAP procedure (Van den Dungen and Verbeek, 1999).

As was also mentioned in 11.1, the PI-interviewers may have facilitated the PI-children in continuing conversational topics by waiting with patience for answers to come on questions about a topic. Here, the PI-interviewers also may help the PI-children because they introduce and pursue topics which they think the PI-children can manage (e.g. Sinclair and Coulthart, 1995). The PI-interviewers only pursue those topics introduced by PI-children which are within the permitted topics for the STAP procedure (see 3.4.2). Uninterpretable, incoherent or irrelevant contributions not within this conversational topic plan, tend to be ignored or to be clarified (Smith and Leinonen, 1992:133). The PI-interviewers may have been more facilitating with respect to topic management than the N-interviewer.
In order to answer the question whether the PI-children manage the conversational topic as well as the N-children, we first analyse how the PI-interviewers differ in structuring conversational topics compared to the N-interviewer.

Following Roelofs (1996), the following coding categories for the analysis of topic management are used, mainly reflecting new (appropriate semantic/pragmatic behaviour) versus old information.

With respect to new information, the following three options are possible: (1) topic introduction, when the expressed information is brand-new, (2) topic continuation, when more detailed information is given about the same content expressed in the preceding contribution(s), (3) topic link, when the information is partly linked to the content expressed in the preceding contribution(s).

With respect to old information the following two options are possible: (4) resumed topic, when a conversational topic that has been finished is resumed (Example 1).

**Example 1**  Resumed topic expressed by the PI-interviewer (PI-child; age 8:2)

Interviewer:  en kun je nog iets over jullie hond vertellen, over Rex?
( and can you tell me something more about your dog, about Rex?)

This is also scored when the interviewer resumes a topic after a child has side-tracked. This is the case when topic digression takes place (e.g. Renkema, 1993). **Topic hold** (5) is scored when the information of a previous contribution is repeated and no new information is added.

In order to choose between one of the five coding categories, we first looked at the whole interview to decide what the interview was about, globally differentiating different conversational topics (top-down). We decided for each communicative contribution how the information expressed was linked to the ongoing conversational topic (bottom-up). In Table 12.1 we present the topic management by the PI-interviewers compared to the N-interviewer.

<table>
<thead>
<tr>
<th>Topic Management</th>
<th>N-Interviewer n=1</th>
<th>PI-Interviewers n=2</th>
</tr>
</thead>
<tbody>
<tr>
<td>New information</td>
<td>74.4%</td>
<td>57.2%</td>
</tr>
<tr>
<td>Topic introduction</td>
<td>7.0%</td>
<td>4.1%</td>
</tr>
<tr>
<td>Topic continuation</td>
<td>54.5%</td>
<td>23.2%</td>
</tr>
<tr>
<td>Topic link</td>
<td>12.9%</td>
<td>29.9%</td>
</tr>
<tr>
<td>Old information</td>
<td>25.6%</td>
<td>42.8%</td>
</tr>
<tr>
<td>Topic resumed</td>
<td>6.1%</td>
<td>8.0%</td>
</tr>
<tr>
<td>Topic hold</td>
<td>19.5%</td>
<td>34.8%</td>
</tr>
</tbody>
</table>
From Table 12.1, we see that the PI-interviewers produce significantly fewer topic introductions and topic continuations (new information), but significantly more resumed topics and topic holds (old information) than the N-interviewer. Surprisingly, the PI-interviewers also produced more topic links than the N-interviewer. With the older children, both PI-interviewers and N-interviewer produced significantly fewer topic holds (linear decrease), influencing the quality of the interview positively.

These results indicate that the PI-interviewers spend more time clarifying or resuming old information and therefore have less time to spend on brand-new information compared to the N-interviewer. A comparable pattern of communicative interaction was found in 12 Dutch-speaking mothers of Specific LI-children younger than four years of age: these mothers spent significantly more time on old information than 6 Dutch-speaking mothers of same-aged N-children (Van Balkom, 1991).

When not enough satisfactory information about a certain topic was given by N-children, more requests for new (topic introduction) or detailed (topic continuation) information easily were expressed by the N-interviewer by using leading questions. Contrary to this semantic/pragmatic behaviour, a relatively low amount of topic introductions and high amount of topic links expressed by the PI-interviewers show that they frequently had to use the strategy of topic shading (Brinton and Fujiki, 1984). Topic shading is defined as the frequent, successive use of topic links. Topic shading had to be used relatively frequently by the PI-interviewers in order to avoid the PI-children difficulties with talking about one topic in detail.

Whenever the PI-interviewers found a conversational topic PI-children were able and willing to talk about, the PI-interviewers frequently chose to express topic links in order to talk as long as possible about related topics. They avoided leading

1 ANCOVA with the number of communicative contributions as covariate; group effect F(1,164)=34.41, p<0.0001 (nine-year-old PI-children excluded); no significant linear age effect was found, using oneway ANCOVA (Polynomial contrast) with the same covariate (nine-year-old PI-children excluded). We have to keep in mind, that the number of communicative contributions expressed by the children decreases with age (10.2). Therefore, we used for the statistical analysis procedures ANCOVA's with the number of communicative contributions as covariate.

2 ANCOVA with the number of communicative contributions as covariate; group effect: F(1,164)=201.38, p<0.0001; age effect F(4,164)=4.16, p<0.003; age*group interaction effect F(6.85, p<0.0001. One way ANCOVA with the same covariate: age effect: N-interviewer F(4,69)=8.0, p<0.0001; Linearity: p<0.0001.

3 ANCOVA with the number of communicative contributions as covariate; group effect: F(1,164)=9.82, p<0.002; no age or age*group interaction effects were observed (nine-year-old PI-children excluded).

4 ANCOVA with the number of communicative contributions as covariate; group effect: F(1,164)=101.00, p<0.0001; age effect F(4,164)=3.69, p<0.007; no age*group interaction effect was observed.

5 idem; group effect: F(1,164)=83.61, p<0.0001; age effect: F(4,164)=6.63, p<0.0001; age*group interaction effect F(4,164)=7.26, p<0.0001. According to one-way ANCOVA no linear age effects were found.

6 One way ANCOVA (Polynomial contrast): N-interviewer F(4,69)=6.84, p<0.0001; Linearity: p<0.0001; PI-interviewers F(5,113)=2.87, p<0.018; Linearity: p<0.0001 (nine-year-old PI-children included).
questions about brand-new topics (topic introduction) and questions that ask for more detailed information (topic continuation). From experience they knew that there was a risk of eliciting minimal responses or getting no response at all (see 11.7). Thus, the conversational strategy of topic shading proved to be the most useful in interviews with PI-children (Example 2).

Example 2

**Topic link expressed by the PI-interviewer (conversational topic is a writing contest)**

(PI-child; age 8;2)

Tanja:  

Interviewer:  

\[\text{i\k heb niet gewonnen} \]  

\[\text{(I did not win)}\]  

\[\text{ga je het de volgende keer nog weer proberen?} \]  

\[\text{(are you going to try it the next time?)}\]  

In Example 2, the conversational topic ‘winning a writing contest’ is not discussed in detail by means of questions such as ‘why did you not win?’ or ‘was it difficult to win?’ and so on. The PI-interviewer asked the PI-child about future plans with respect to writing contests, scored as topic link.

In sum, we have the impression that the PI-interviewers stimulated the PI-children in their performance. If they had expressed as many topic introductions and continuations as the N-interviewer, increasing the pressure on the PI-children to come up with more new and detailed information about a certain conversational topic, many PI-children would not have been able to fulfil the interview task. In the following, we will investigate whether the PI-children are performing worse than the N-children with respect to topic management. If the PI-children are, this is probably despite the support of the PI-interviewers.

In order to answer this question, we use the same coding categories as described above. We judged whether the content of communicative contributions expressed by the N- and PI-children concern new information, such as topic introductions, topic continuations and topic links, or whether they concern old information, such as topic holds. In the following, we will explain each coding category in more detail.

A **topic introduction** is scored if the information expressed by the child concerns new information. This is the case when children ask for information; these were mostly judged as pragmatically marked, as the interviewer is expected to introduce the topics of conversation (Peterson and McCabe, 1992) (see 11.6) (Example 3).

Example 3

**Topic introduction expressed by the child (PI-child; age 5;10)**

Interviewer:  

Tommy:  

\[\text{en hoe zagen jullie dan dat tie niet dood was?} \]  

\[\text{(and how did you see that he was not dead?)}\]  

\[\text{#3 nou <eh> weet je, wat mijn papa weleens gedaan heb?} \]  

\[\text{(#3 now do you know, what my dad has done once?)}\]  

The differentiation between topic continuations and topic links is important in order to detect children’s difficulties with topic management. A high amount of topic continuations reflects that children are able to tell more in detail about one topic.
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A high amount of topic links reflects that children are only able to produce more loosely and associatively connected information, whereby the topic slightly shifts from one contribution to the other (topic shading). The strategy of topic shading used by the children might differ from this strategy used by the interviewers; children presumably avoid morphological/syntactic and semantic/pragmatic difficulties, whereas interviewers avoid communication breakdowns.

Until now no model presents unambiguous criteria to differentiate topic continuations from topic links (Renkema, 1993:65). Topic continuation is coded when something new is said about an already known topic, mostly expressed by contributions that are part of extended discourse with a narrative character (see 11.5).

In order to differentiate topic continuations from topic links, we looked for old information (mostly in topic-position; referred to with pronouns; not accentuated by metalinguistic intonation features) as opposed to new information (mostly in focus-position; referred to with noun(phrase)s; accentuated) within each communicative contribution (e.g. Dik, 1989; Renkema, 1993; Roelofs, 1998:35) (Examples 4 and 5). In both examples old information in topic-position is underlined and new information in focus-position is presented in italics.

Example 4

Interviewer: en gaan jullie weleens samen spelen?
(J and are you sometimes playing together?)
Jeroen: ja.
(yes).
Interviewer: wat doen jullie dan?
(what are you doing then?)

In Example 4, the conversational topic can be discussed in more detail by answering a wh-questions (where, when, how) expressed by the interviewer (Mazeland, 1992) about the NP in topic-position 'jullie' (you) that is the same as the NP in topic-position of the previous communicative contribution 'jullie' (you). The new information in focus-position 'wat' (what) is semantically closely related to the ongoing conversational topic 'samen spelen' (playing together).

Example 5

Interviewer: vertel ò eens iets over de hond.
(tell ò something about the dog)
Rick: hij houdt van vlinders.
(he loves butterflies)
Interviewer: <hm> hij speelt met # <eh> twee voeten omhoog
(he plays with # <eh> two feet in the air)

In Example 5, the NP in topic-position 'hij' (he) is the NP in focus-position of the previous communicative contribution 'de hond' (the dog). The information in focus-
position 'houdt van vlinders' (loves butterflies) is new and related to the ongoing conversational topic 'de hond' (the dog).

A **topic link** can also be expressed by children, gradually changing the conversational topic to another point of view, expressing things from a different line of approach (topic shading) (see also Mazeland, 1992:81) (Example 6).

**Example 6**  
*Topic link (PI-child; age 8;0)*

Natascha:  
*ik heb ook een Barbie boek.*  
(I have got also a Barbie book)

Natascha:  
*en daar zitten Barbie stickers in.*  
(and it has got Barbie stickers in it)

Natascha:  
*en dan ga ik misschien ga ik Barbie stickers sparen.*  
(topic link)  
(and maybe I will collect Barbie stickers)

In Example 6, the new information in focus-position shades (changes) per communicative contribution from 'Barbie book' to 'Barbie stickers' to 'collecting Barbie stickers'. It seems that the child expresses associative items that all are loosely connected to 'playing with Barbies', jumping from one item to the other. **Topic shading** is probably a milder form of what Bishop and Adams (1989:254) call **topic drift**. This was coded when the English-speaking LI-children they studied drifted off into talk about something that was connected to the original conversational topic, but not really in a relevant way (see also 12.6 on 'elaboration'). Relevancy is, of course, a question of degree.

A **topic hold** is coded when the conversational topic is repeated. The information asked for concerns old information, such as expressed by a request for clarification, or the information expressed is already known and redundant, like repetitions (Example 7) (12.6).

**Example 7**  
*Topic hold expressed by the child (PI-child; age 5;10)*

Tommy:  
*maar die (speelgoedje) is helemaal kapot gegaan*  
(but that (little toy) is totally broken)

Interviewer:  
*oh.*

Tommy:  
*ik heb hem laten vallen.*  
(I let it fall)

Tommy:  
*toen ging die kapot.*  
(then it broke)

In Example 7, the information 'toen ging die kapot' (then it broke) is repeated and therefore the whole contribution is coded as **topic hold**.

In sum, the amount of topic continuations per interview is globally indicative of the N- and PI-children's ability to transmit relevant information. In the conversational interview genre, topic introductions and topic links, both concerning **new** information, and especially topic holds, concerning **old**, redundant information, are signs of an inability to manage the conversational topic.
12.2.2 Results: Topic Management

In Table 12.2 it is shown that the PI-children do most of the time what is expected, that is they mostly talk about topics introduced by the interviewer, although the PI-children show this behaviour less frequently than the N-children.

Table 12.2 Mean total percentages of topic continuations, topic links, topic introductions, and topic holds (calculated over communicative contributions) expressed by 75 N-children (Roelofs, 1998) and 120 PI-children

<table>
<thead>
<tr>
<th>Topic Management</th>
<th>N-children n=75</th>
<th>PI-children n=100</th>
</tr>
</thead>
<tbody>
<tr>
<td>New information (total)</td>
<td>92.7%</td>
<td>87.3%</td>
</tr>
<tr>
<td>Topic continuation</td>
<td>81.0%</td>
<td>69.7%</td>
</tr>
<tr>
<td>Topic link</td>
<td>10.1%</td>
<td>15.8%</td>
</tr>
<tr>
<td>Topic introduction</td>
<td>1.6%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Old information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topic hold</td>
<td>7.3%</td>
<td>12.7%</td>
</tr>
</tbody>
</table>

Despite the guidance of the PI-interviewers, the PI-children transmit far less new, detailed information about the ongoing conversational topic. The PI-children thus transmit far less relevant information than the N-children. First, the PI-children produce significantly fewer topic continuations\(^7\) and more topic links\(^8\) than the N-children. The PI- and N-children are comparable\(^9\), however, in their very small amount of initiatives to introduce a new topic. Second, the PI-children produce significantly\(^10\) more topic holds than the N-children.

The development of the production of topic continuations is shown in Figure 12.1. We observed a linear increase in topic continuations\(^11\) in the N-children, but this is not found in the PI-children.

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\(^{7}\) ANOVA with the number of communicative contributions as covariate: \(F(1,164) = 63.43, p<0.0001\); age effect: \(F(4,164)=10.01, p=0.0001\); age*group interaction effect: \(F(4,164) = 2.86, p=0.025\) (nine-year-old PI-children excluded).

\(^{8}\) ANCOVA with the number of communicative contributions as covariate: group effect \(F(1,164)=33.54, p<0.0001\); age effect \(F(4,164)=6.41, p=0.0001\); age*group interaction effect \(F(4,164)=4.89, p<0.001\) (nine-year-old PI-children excluded).

\(^{9}\) As opposed to the analysis of first pairparts expressed by the children (11.6), the topic introductions expressed by the first contribution of a narrative episode/extended discourse with a narrative character are included.

\(^{10}\) ANCOVA with the number of communicative contributions as covariate; group effect \(F(1,164)=37.28, p<0.001\); age effect \(F(4,164)=2.79, p=0.028\); No age*group interaction effect was found (nine-year-old PI-children excluded).

\(^{11}\) One-way ANCOVA with the same covariate: \(F(4,69)=8.47, p<0.0001\); Linearity: \(p=0.0001\).
The percentage topic continuations (calculated over all communicative contributions coded for topic) expressed by 75 N-children (Roelofs, 1998) and 120 PI-children.

From Figure 12.2 it is obvious that in interviews with four to eight-year-old N-children the strategy of topic shading is quite frequently used (around 10% of all contributions) (see Brown, 1973 for the 10%-criterion).

This means that N-children within this age range are quite associative in the way they manage conversational topics. Topic links significantly linear decrease\(^\text{12}\) with

\(^{12}\) One-way ANCOVA with the same covariate; N-children (F(1,169)=2.60, p<0.043; Linearity: p<0.006).
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age in the N-children, especially from eight years on. This suggests that the major
development of reducing topic links takes place beyond age eight. However, no data
are available on the amount of topic links expressed by Dutch-speaking adults in the
conversational interview genre.

From Figure 12.2 we also see that the PI-children produce more topic links than the
N-children as a group. The significant group effect was mainly caused by the four-,
seven- and eight-year-old PI-children. We have no explanation for the relatively low
amount of topic links produced by the five- and six-year-old PI-children, although
this percentage was still around 10% (Brown, 1973). Topic links significantly linear
decrease with age in the N-children, but not in the PI-children. The nine-year-old PI-
children produce an even higher amount of topic links than the four-year-old N-
children.

Ideally, topics are organized in two ways: (1) more general information is expressed
before more specific information, and (2) more salient information is expressed
before less salient information (Van Dijk, 1977; Roelofs, 1998). Children have to
learn to make a choice between these two important organising principles, as the
more specific information is frequently also the most salient.

A closer look at the data reveals that in the PI-children the most salient information
is quite frequently triggered by what they think is the most salient from their own
point-of-view, resulting in more topic links. This is comparable to N-children as
young as three or four years (Hulit and Howard, 2002). Many PI-children, even in
the oldest age groups, cannot determine that the information asked for by the PI-
interviewer is the most salient at that moment in conversation.

In the conversational interview genre, in general the interviewer introduces new
topics. We see from Figure 12.3 that there is no significant group effect, but a
significantly\(^{13}\) linear decrease of topic introductions with age in both N- and PI-
children. This result reflects that the PI-children develop role awareness as quick as
the N-children: they learn with age that an interviewee should just respond to topics
introduced by the interviewer in the conversational interview genre. However, we
have already shown that when topic introductions are expressed by requests for
information, judged as semantically/pragmatically marked behaviour, the PI-
children do this significantly more frequently than the N-children (see 11.6.2). In
section 12.3, we will explore whether topic introductions can be judged as marked
and as violating the Maxim of Relation, being coded then as unmarked topic shift.

\(^{13}\) One way ANCOVA (Polynomial contrast) with the same covariate: N-children (F(1,69)=4.77,
p<0.002; Linearity \(p<0.0001\); PI-children (F(5,113)=5.0, \(p< 0.0001\); Linearity \(p< 0.0001\)) (nine-
year-old PI-children included).
The percentage topic introductions (calculated over all communicative contributions coded for topic) expressed by 75 N-children (Roelofs, 1998) and 120 PI-children.

In Figure 12.4, we present the development of age of the production of topic holds. As we already mentioned, the PI-children repeat old information that is redundant and express contributions that contain no new information more frequently than the N-children.

Since topic holds contain old information these instances were judged as relatively less relevant and as having a negative influence on the quality of the interview. In general, we suppose that with age the N- and PI-children will express more relevant information. We therefore expected that PI-children and younger N- and PI-children will produce more topic holds than N-children and older N- and PI-children, respectively. But, unexpectedly, although topic holds decrease over time in both N-children and PI-children, the differences were too small to observe a significant
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linear age effect. We might expect that a decrease in topic holds slowly develops over the years beyond age eight/nine. We know, however, little about the amount of topic holds expressed by teenagers and adults in the conversational interview genre. Topic holds have different functions, such as the function of a thinking pause necessary to plan further information (1), an attempt to reorganise language information in a logical, causal manner within extended discourse (2), an instance of one of the most important persuasive strategies children have to learn (Van Eeemeren and Grootendorst, 1984) (3), and an attempt to get a new conversational topic introduced by repeating old information in a post-response-traject (Mazeland, 1992:226) (4). Only function (1) may influence the quality of the interview badly, whereas the other three functions just contribute towards functionality. We therefore propose that the function of topic holds should be further explored in the future. It might be only the function of topic holds that changes over time.

12.2.3 Conclusion: Topic Management
The results of the analysis of topic management are in line with previous results in this research in that in general the transmission of information in interviews with PI-children is less efficiently organized. The stimulating effort of the PI-interviewers with respect to topic management is comparable to the stimulating guidance discussed earlier, that is waiting longer for an answer to come (see 10.5.1) or giving more feedback and asking more pre-requests to activate a semantic field (see 11.1). Related to topic management, the PI-interviewers had to use the strategy of topic shading more frequently compared to the N-interviewer in order to elicit information that was new and relevant. However, despite this extra support, the PI-children were not as good as the N-children in transmitting new and thus more relevant information. We showed that significantly more contributions of the PI-children concern old, redundant information and are only loosely linked to the ongoing conversational topic (see also Sperber and Wilson, 1986:46). There also exists a higher frequency of the strategy of topic shading by the PI-children compared to N-children. In sum, we state that most PI-children show difficulties in the management of conversational topics, especially in the ability to maintain a conversational topic, talking about a certain topic in more detail.
In the next section, we will explore the ability to link contributions coherently. This is a more detailed analysis of the ability to transmit relevant information than the analysis of topic management, although some coding categories may slightly overlap.
12.3  Introduction to Coherence

We already mentioned that linking contributions coherently means using implicit and explicit semantic connections between and within communicative contributions (see 12.1). For the analysis of coherence, the model designed for Dutch by Roelofs (1998) is used, based in turn on the model developed for English (Bishop and Adams, 1989). According to the Dutch model, contributions can be identified as 'coherently' or 'incoherently' linked to the ongoing conversation reflecting children's (dis)ability to follow the Maxims of Grice (1975). Communicative contributions that are not clearly linked in content to the previous contributions and contain, for example, redundant, ambiguous or too little/much information can be judged as incoherently linked to the ongoing conversation (Table 12.3).

We will explore whether PI-children are as good as N-children in the ability to link communicative contributions coherently. And, is there comparable development with age? In general, N-children actively try to make a coherent whole of their message content and form like adults tend to do (e.g. Gernsbacher and Givón, 1995; Sperber and Wilson, 1986). Younger N- and PI-children and PI-children as a group are expected to have more difficulties in this respect than N-children. The PI-children may not only be less co-operative, i.e. motivated to aim for relevancy, but also may be less able to organize information into a coherent whole (e.g. Van Berckelaer-Onnes, 2002; see 2.3.1). Not only their morphological/syntactic difficulties may play a part (see 4.2), but also social-cognitive difficulties. The ability to link sentences coherently makes a great demand on the social-cognitive capacities of children since they have to take into account the listener's point of view and world knowledge, both of which are part of the development of a Theory- of-Mind (Perner, 1991; Wellman, 1992) (see 2.3.3).

Roelofs (1998:123) suggests that some violations can have a greater negative semantic-pragmatic impact than others, related to the idea that with age the most severe violations will decrease more rapidly than the less severe violations. The violations of the Maxims are therefore ordered from relatively more severe to less severe (1 to 5) (see also Grice, 1975; Leech, 1983; Sperber and Wilson, 1986; Levinson, 1987; Mazeland, 1992).

The more severe the violations, the more the co-operative principle is ignored or also violated. For instance, violations of the Maxim of Relation (1) and Relevance (2) both signal an incoherency between the child's reaction and the interviewer's initiative. Violation of the Maxim of Relation (1) also suggests that even the co-operative principle is violated, because the child pays no attention to what the interviewer says and therefore the child's contribution is not a real response to the interviewer's initiative. These violations (1) are therefore judged as more severe than violations of the Maxim of Relevance (2) where the child takes into account what the interviewer says but gives a semantically/pragmatically inappropriate response. Therefore violations of the Maxim of relation (1) are presented at first position in the proposed hierarchy.
Giving *too little information* (3) frequently results in a contribution that is not clear at all or only partly understandable. Expressing *too much information* (4) is giving redundant information, but the message mostly is clear: in Table 12.3 (3) is therefore presented higher in the ordering than (4).

However, the hierarchy proposed by Roelofs (1998) is debatable. For instance, giving false, ambiguous information (5) seems to be worse and mirrors less cooperative behaviour than giving too much, but true information (4). Moreover, the relative frequency of violations also might be of influence on their overall semantic/pragmatic effect. For example, an extreme number of violations of the Maxim of Quantity may have a greater negative effect on the communication in general than a few instances of all violations, even if these violations were ordered higher in the hierarchy.

Table 12.3  *The coding categories with respect to the analysis of incoherence* (Roelofs, 1998) *based on violations of the Maxims of Grice* (1975)

<table>
<thead>
<tr>
<th>Maxims of Grice</th>
<th>Categories of incoherence (Roelofs, 1998)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maxim of Relation</strong></td>
<td>1. Violations of the Maxim of Relation</td>
</tr>
<tr>
<td>Be relevant</td>
<td>- unmarked topic shift</td>
</tr>
<tr>
<td></td>
<td>- ignoring initiation</td>
</tr>
<tr>
<td></td>
<td>2. Violations of the Maxim of Relevance</td>
</tr>
<tr>
<td></td>
<td>- different content connection</td>
</tr>
<tr>
<td></td>
<td>- different intention connection</td>
</tr>
<tr>
<td></td>
<td>- contextual yes/no implication</td>
</tr>
<tr>
<td><strong>Maxim of Quantity</strong></td>
<td>Violations of the Maxim of Quantity</td>
</tr>
<tr>
<td>Make your contributions as</td>
<td>3. <em>too little information:</em></td>
</tr>
<tr>
<td>informative as required</td>
<td>- gap</td>
</tr>
<tr>
<td></td>
<td>- jump</td>
</tr>
<tr>
<td>Do not make your contributions</td>
<td>4. <em>too much information:</em></td>
</tr>
<tr>
<td>more informative than is required</td>
<td>- repetition</td>
</tr>
<tr>
<td></td>
<td>- reiteration</td>
</tr>
<tr>
<td></td>
<td>- elaboration</td>
</tr>
<tr>
<td><strong>Maxim of Quality</strong></td>
<td>5. Violations of the Maxim of Manner/Quality</td>
</tr>
<tr>
<td>Do not say what you believe is false</td>
<td>- ambiguous or false information</td>
</tr>
<tr>
<td>or do not say that for which you</td>
<td></td>
</tr>
<tr>
<td>lack adequate evidence</td>
<td></td>
</tr>
<tr>
<td><strong>Maxim of Manner</strong></td>
<td></td>
</tr>
<tr>
<td>Avoid obscurity of expression/</td>
<td></td>
</tr>
<tr>
<td>avoid ambiguity/ be brief/ be</td>
<td></td>
</tr>
<tr>
<td>orderly</td>
<td></td>
</tr>
</tbody>
</table>

Although the *model of incoherency* has no one-to-one mapping to the original Maxims proposed by Grice (1975), it proved to be quite attractive and highly applicable for the identification of the amount of different types of incoherencies, reflecting semantic-pragmatic disorder. The Dutch model, for instance, differentiates
more precisely between different types of pragmatically inappropriate responses, first proposed by Bishop and Adams (1989). The different violations reflect the coding categories of the analysis of the ability to be coherent. Each category will be defined in the following sections in more detail.

12.4 Violations of the Maxim of Relation

12.4.1 Research questions, definitions and operationalisations

When a contribution has no direct connection with the ongoing conversational topic expressed in the previous communicative contribution(s), the Maxim of Relation is violated (Table 12.4). The child talks about something completely different than the interviewer at that moment in conversation. This is even a violation of the cooperative principle, coded as unmarked topic shift or ignored initiation.

An unmarked topic shift was coded when the child suddenly introduces a new conversational topic, ignoring the ongoing conversational topic (Example 8).

Example 8

Interviewer: vind je het leuk om in de tuin te werken? (do you like to work in the garden)
Carina: knikt. (nods)
Carina: en de slager kun je ook tegen zeggen barbecue. (and the butcher can you say barbecue)
Paraphrasis: and to the butcher one can say: "we have a barbecue".

In Example 8, the PI-child associatively might have linked the notions 'garden' with 'barbecue' and 'butchers'. Unmarked topic shifts can be observed frequently in N-children younger than four years of age and in (older) LI-children (e.g. Bishop and Adams, 1989; McTear and Conti-Ramsden, 1992; Sahlén and Nettelbladt, 1993).

Ignored initiation was coded when the child ignores the initiative of the interviewer (Example 9).

Example 9

Interviewer: en hoe oud is Lotje? (and how old is Lotje?)
Emiel: wij gaan maandag naar de dierentuin (we will visit the zoo on Monday)

Beside these type of violations that signal pragmatic problems, children may also have problems with the uptake of verbal information or in taking someone else's point-of-view. Then, children express their own associations that are triggered by a

14 This category partly overlaps with the category topic introduction (see 12.1).
15 See for the difference between language input, uptake and intake Van den Bogaerde (2000:7).
question, but they do not check if what comes to mind is relevant in relation to what is asked for.

12.4.2 Results: Violations of the Maxim of Relation

Figure 12.5 shows that the PI-children make significantly more unmarked topic shifts than the N-children, violating the Maxim of Relation.

![Graph showing the percentage of unmarked topic shifts (UTS) over the communicative contributions coded for topic]  

We see that the four- and five-year-olds in both groups produce the most unmarked topic shifts, whereas the eight-year-old N-children produce hardly any. The PI-children lag behind in their semantic/pragmatic development, as the amount of unmarked topic-shifts in eight- and nine-year-old PI-children is more or less comparable to the amount in six-year-old N-children.

With age the percentage unmarked topic shifts significantly decreases in both N-children (Roelofs, 1998:127) and PI-children. In order to make topic continuations in the conversational interview genre, one of the necessary conditions is to be focussed on the topics of the interviewer. Although we did not find that the ability to continue a conversational topic develops linearly with age in the PI-children, as opposed to the N-children (12.2), we observe that the PI-children become more sensitive to the topics expressed by the interviewers with age, although at a slower rate than the N-children.

16 ANCOVA with the number of 'communicative contributions coded for topic' as covariate; group effect: \(F(1,164)=7.73, p<0.006\); age effect \(F(4,164)=17.96, p<0.001\); no age*group interaction effect was observed (nine-year-old PI-children excluded).

17 ANCOVA (Polynomial contrast) with the same covariate; N-children \(F(5,69)=6.33, p<0.001\); Linearity \(p=0.0001\); PI-children \(F(5,113)=15.13, p<0.001\); \(p=0.0001\) (nine-year-old PI-children included).
Figure 12.6 shows that PI-children ignore an initiative of the interviewer significantly\(^{18}\) more frequently than the N-children, also violating the Maxim of Relation. When we look at the percentage ignored initiations, we see that not only the five- and six-year-old PI-children, but also the eight- and nine-year-old PI-children show comparable behaviour. Therefore, post hoc trend analysis showed only a linear decrease with age in the N-children\(^{19}\) (Roelofs, 1998:127), not in the PI-children. The eight-year-old N-children no longer ignore initiations expressed by the N-interviewer at all.

**Figure 12.6** The percentage ignored initiations (calculated over the communicative contributions coded for topic) expressed by 75 N-children (Roelofs, 1998) and 120 PI-children

<table>
<thead>
<tr>
<th>Age</th>
<th>N-chi: ignoring initiation</th>
<th>PI-chi: ignoring initiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 yrs</td>
<td>1.9</td>
<td>3.5</td>
</tr>
<tr>
<td>5 yrs</td>
<td>1.5</td>
<td>2.2</td>
</tr>
<tr>
<td>6 yrs</td>
<td>0.2</td>
<td>2</td>
</tr>
<tr>
<td>7 yrs</td>
<td>0.4</td>
<td>1.3</td>
</tr>
<tr>
<td>8 yrs</td>
<td>0</td>
<td>0.5</td>
</tr>
<tr>
<td>9 yrs</td>
<td>0</td>
<td>0.5</td>
</tr>
</tbody>
</table>

12.4.3 Conclusion: Violations of the Maxim of Relation

We showed that the PI-children significantly more frequently produced unmarked topic shifts and ignored the interviewer's initiations than the N-children. Although the amount of ignored initiations was relatively lower than the amount of unmarked topic shifts, each violation has a clear negative impact on the ongoing conversation. Both violations signal severe semantic/pragmatic difficulties in the interview genre and reflect non-co-operative language behaviour. These results are similar to earlier findings that indicate a higher proportion of pragmatically inappropriate responses in English-speaking pragmatic LI-children than in same-aged N-children (Bishop et al., 2000).

When we look at development with age, we observed that the PI-children lag behind in comparison to the N-children. The N-children develop a growing role-awareness and eight-year-old N-children violate neither types anymore. However, the PI-

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18 ANCOVA with the number of communicative contributions coded on topic as covariate; group effect (F(1,164)=9.14, p<0.003); age effect: F(4,164)=3.50, p<0.009); no age*group interaction effect was observed.

19 ANCOVA (Polynomial contrast) with the same covariate. N-children: (F(4,69)=7.34, p<0.001, Linearity p<0.0001).
children show a language delay of approximately three to two years with respect to these two semantic/pragmatic language abilities. According to the hierarchy pointed out above (Roelofs, 1998), it is predicted that unmarked topic shifts decrease with age more quickly than the relatively less severe ignored initiations. This proved indeed to be the case in the N-children, especially in the younger age groups. This developmental tendency was also observed in the PI-children, although at all ages they make more violations of the Maxim of Relation of both types than the N-children.

12.5 Violations of the Maxim of Relevance

12.5.1 Research questions, definitions and operationalisations
When the content of the child's reaction is only partly connected to the content of the initiative of the interviewer, three different semantic/pragmatic connections have to be checked: different content connection, different intention connection and contextual yes/no implication. This part of the analysis deals with the quality of responses to information-soliciting contributions, that is to what extent do the answers match the expectations set up by the questions (Bishop et al., 2000). In this respect, this section is closely related to those sections from Chapter 11 that are concerned with the analysis of difficulties in being responsive (see 11.2 to 11.4). We might expect some problems in the PI-children in this respect. In general, (S)LI-children are observed to have a lower rate of semantically/pragmatically adequate responses than younger and MLU-matched N-children (Bishop et al., 1987; Rosinski-McClendon and Newhoff, 1987); this seems especially the case in pragmatical LI-children (Bishop et al., 2000).

First, the answer of the child is not necessarily an answer to the question asked by the interviewer: the content of the answer can be about another question, other people, objects, etc. than asked about. In such cases the first communicative contribution of the response expressed by the child is coded as different content connection (Example 10). This type of violation may be caused by the child's inability to fully comprehend the question.

Example 10 Different content connection: violation Maxim of Relevance (PI-child; age 8.1)

Interviewer: en in welke plaats woon jij? (and in which town do you live?)
   <Suprphoes> [streetname unclear] thirty-seven

In Example 10, the child answers as if asked 'and what is the name of the street and your house number?'.

Second, the answer is not what the interviewer wants, because the content of the answer is too specific (Van Dijk, 1977) or too general (Smith and Leinonen, 1992), or about another aspect than asked for. This violation is mostly caused by the child's
inability to interpret the implicit information that had to be inferred from what was explicitly asked for the interviewer. These instances were coded as different intention connections (Example 11).

**Example 11**  
Different intention connection: violation of Maxim of Relevance (PI-child; age 4.6)

Interviewer: en heb jij ook zwemles?  
(Go you have swim-lessons?)

Guusje: ja.  
(yes)

Interviewer: en hoe gaat dat?  
(and what happens there?)

Guusje: goed.  
(good)

In Example 11, the PI-child answers as if was asked 'how is it going?' instead of 'what happens there?'. An appropriate answer would have been: when I arrive there, I first put on my bikini, then I ..... and so on. The PI-child wrongly interprets the question, because in Dutch there is only a very small difference between the question 'and what happens there?' (hoe gaat dat?) and 'how is it going? (hoe gaat het?), although the intonation differs between the two: 'hoe gaat dat?' respectively 'hoe gaat het?'.

Even up to six/seven years of age N-children seem to make no clear distinction between actual message meaning and speaker's intended meaning (Frye and Moore, 1991). Bishop and colleagues (2000) observed that pragmatic LI-children (LI-children with mainly pragmatic language impairment) had a relatively high level of pragmatically inappropriate responses that were not readily accounted for in terms of limited morphosyntax or vocabulary. Many of these over-literal responses reflected difficulties in responding to (indirect) communicative intents.

Third, a contextual yes/no implication is coded when in the reaction of the child the yes/no answer is not explicitly expressed, because it can be inferred from the answer given. The child shows to ability to reduce redundancy. This ability is therefore judged as semantically/pragmatically appropriate behaviour. The answer in which the yes/no content is incorporated is mostly a coherent, relevant reaction to the question asked (Example 12).

**Example 12**

Contextual yes/no implication (PI-child; age 9:1)

Interviewer: hebben jullie thuis huisdieren?  
(do you have pets at home?)

Manilla: alleen een parkiet  
(only a parakeet)

Paraphrasis: yes.  
(only a parakeet)

The first two subtypes different content connections or different intention connections are clear violations of the Maxim of Relevance, reflecting semantically/
The ability to transmit relevant information

pragmatically inappropriate behaviour. Contextual yes/no implications reflect sophisticated semantic/pragmatic behaviour.

12.5.2 Results: Violations of the Maxim of Relevance

Figure 12.7 shows that the PI-children produce significantly more different content connections than the N-children.

Figure 12.7 The percentage different content connections (calculated over the communicative contributions coded for topic) expressed by 75 N-children (Roelofs, 1998) and 120 PI-children

With age the amount of different content connection violations linearly decrease with age in both groups (Roelofs, 1998:128), although the N-children improve more quickly than the PI-children. The older PI-children, however, still make three times as many violations of this type compared to the older N-children. A closer look at the data suggests that the younger PI-children have most problems with giving the answer asked for, mainly due to comprehension problems, comparable to the N-children. In the older age groups, eight- and nine-year-old PI-children and the seven- and eight-year-old N-children seem to reach a ceiling effect.

Figure 12.8 shows that different intention connection violations are more frequently found in the PI-children than in the N-children. The PI-children give significantly more responses that do not fit the intended meaning of the PI-interviewers' question.

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20 ANCOVA with the number of communicative contributions coded on topic as covariate. group effect: (F(12.04, p<0.001); age effect F(4,164)=9.90, p<0.001); no age*group interaction effect was observed (nine-year-old PI-children excluded).

21 ANCOVA (Polynomial contrast) with the same covariate; N-children: F(4,69)=8.39, p<0.001, Linearity: p=0.0001; PI-children: F(5,113)=3.66, p<0.007, Linearity: p<0.0001 (nine-year-old PI-children included).

22 ANCOVA with the number of communicative contributions coded for topic as covariate. group effect: (F(1,164)=22.38, p<0.0001); an age effect was not observed; age*group interaction effect: F(4,164)=5.02, p<0.001 (nine-year-old PI-children excluded).
comparable to earlier reports found in English-speaking pragmatic LI-children (Bishop et al., 2000).

Although we see that the PI-children improve with age, especially from four to six years of age, no linear age effect is observed in the PI-children. The amount of different intention connection violations seems relatively more stable over time\(^{23}\) in the N-children (Roelofs, 1998:128), although they slightly improve with age. We clearly see that the nine-year-old PI-children in the end arrive at a more 'normal' level that is comparable to the eight-year-old N-children. The younger the PI-children, the more difficulties they have in computing what is semantically/pragmatically required from them.

Looking more closely at the data, most of these violations are caused by the PI-children's problems with the interpretation of indirect questions (see 11.7), such as requests for acknowledgements and rather implicit questions, such as 'and then?' or 'what next?' whereby most of the specific information asked for has to be inferred from what is said prior to the question asked.

Figure 12.9 shows a totally different pattern from the two previous figures, since contextual yes/no implications reflect semantically/pragmatically appropriate behaviour.

---

\(^{23}\) ANCOVA (Polynomial contrast) with the same covariate: N-children: no significant age effect; PI-children: F(4,94)=4.00, p<0.005, Linearity: p<0.006 (nine-year-olds excluded). PI-children: F(5,113)=3.90, p<0.003, Linearity: p<0.010, (nine-year-olds included).
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Figure 12.9  The percentage contextual yes/no implications (calculated over the yes/no questions) expressed by 75 N-children (Roelofs, 1998) and 120 P1-children

It is clear that the percentage contextual yes/no implications in P1-children is more or less stable over time, whereas we see, as expected, an increase in the N-children, except in the six-year-olds. However, the differences proved to be too small to observe any significant main effects24 (see also Roelofs, 1998:126).

The fact that the four-year-old P1-children are doing so well is mainly caused by four four-year-old P1-children, who were asked relatively many simple yes/no questions. The fact that the six-year-old N-children leave relatively few yes/no answers implicit probably belongs to the developmental trend that N-children are very explicit in their reactions at age six (see also Roelofs, 1998:128).

A possible explanation for not finding any linear age effect is that more contextual yes/no implications can be found in the data than were actually coded as such, like reactions to an initiative of the interviewer in the declarative form (Example 13).

Example 13  Contextual yes/no implication to a statement in the declarative form
(P1-child: age 7;0)

Interviewer:  jij vindt dinosaurussen wel leuk.
(you like dinosaurs).
Bas:==  ik ben er stapelgek op.
(I am mad about them).
Paraphrasis:  yes.
I am mad about them

---

24 Using ANCOVA with the number of second pairparts expressed by the child as covariate (1) and yes/no-question expressed by the interviewer as covariate (highly significant) (2), no main effects are observed.
Furthermore, sometimes a contextual yes/no implication is not semantically/pragmatically adequate behaviour when an explicit yes/no answer would have made things more clear (Example 14).

**Example 14**  
A semantic-pragmatic inadequate contextual yes/no implication  
(PI-child; age 4;10)

Interviewer:  
en komt ze weleens bij jou spelen?  
(and does she sometimes play with you at your home?)

Rudy:  
weet niet waar ik woon.  
(does not know where I live).

Paraphrase:  
no.  
because she does not know where I live

Thus, coding more types of contextual yes/no implications and judging the semantic/pragmatic adequacy per case may give more insight into a possible development, and difficulties in the use of different types of yes/no implications.

### 12.5.3 Conclusion: Violations of the Maxim of Relevance

The PI-children produced different content and intention connections more frequently, violating the Maxim of Relevance significantly more than the N-children. Both violations have a negative impact on the ongoing conversation and reflect relatively severe semantic/pragmatic difficulties in the interview genre with the ability to be responsive (see also Chapter 11). These violations with respect to different content and intention connections are less severe than violations of the Maxim of Relation (see 12.4): in case of different content/intention connections the co-operative principle is still followed, since the children are willing to give a suitable answer. The PI-children try to give a relevant reaction, but this is not or only partly semantically/pragmatically appropriate. Broadly speaking, the PI-children resemble the (S)LI-children and pragmatic LI-children in having a significantly lower rate of semantically/pragmatically adequate responses than N-children (Bishop et al., 1987; Rosinski-McClendon and Newhoff, 1987; Bishop et al., 2000).

When we look at development with age, we observe a significant linear decrease in the production of different content violations in both populations. However, the PI-children show a language delay of approximately one to two years, since older PI-children make as many different content violations as younger N-children do.

With respect to different intention violations we expected a similar developmental pattern. However, we only observed a decrease in four- to six-year-old PI-children, although the older PI-children still make more different intention violations than the N-children. The N-children showed – unexpectedly – no significant linear development over time at all; N-children still have difficulties in computing what is the intention in semantic/pragmatic terms of the interviewer. This result suggests that even N-children older than eight still have to improve their semantic/pragmatic ability to follow the Maxim of Relevance, whereas at that age they no longer violate the Maxim of Relation (see 12.4). This confirms the idea that with age the most severe violations (Maxim of Relation) will decrease more rapidly than the less
severe violations (Maxim of Relevance) (Roelofs, 1998:123). This developmental tendency was also observed in the PI-children. Since with respect to the amount of contextual yes/no implications no significant main effects were found, the PI-children seem as good as the N-children in leaving out redundant yes/no answers, although more detailed research is necessary in order to include all yes/no implications and a judgement of their semantic/pragmatic appropriateness.

12.6 Violations of the Maxim of Quantity: too little information

12.6.1 Research questions, definitions and operationalisations

Communicative contribution can contain too little information, because children omit obligatory morphological/syntactic elements, coded as morphological/syntactic errors (Chapter 5). When children leave out more than these obligatory elements, wrongly supposing that the interviewer can infer the implicit information on the basis of what is explicitly said, these instances are coded as violation of the Maxim of Quantity: too little information and scored as semantic/pragmatic violation of one of the Maxims. Violations of the Maxim of Quantity: too little information are divided into gaps and jumps. In order to detect these types of violations, we make use of paraphrases in which the associative links made internally by the child are made explicit in order to come to an understandable, coherent and thus relevant transmission of information.

A gap is scored when obligatory semantic/pragmatic information of at least one clause or more remains unexpressed. A logical step is missing within extended discourse which would link the child's contribution to the previous ones (e.g. Bishop and Adams, 1989:251) (Example 15).

Example 15

<table>
<thead>
<tr>
<th>Gap: violation of the Maxim of Quantity; too little information</th>
</tr>
</thead>
<tbody>
<tr>
<td>(PI-child; age 7;5)</td>
</tr>
</tbody>
</table>

Interviewer: en heb jij dan geen vader?  
(and don't you have a father?)

missing link: no, I have got a father

Michael: die is gescheiden  
(his is divorced).

missing link: but he is divorced from my mother and doesn't live not with us

missing link: she (my mother) did not want to live with him anymore.

Michael: iedere keer als ie een pilsje op, dan neemde ie de nog een  
(because every time he had a lager, he drank another one from early in the morning till late in the evening)

van 's morgens vroeg tot 's avonds laat.

Paraphrasis: want iedere keer als ie een pilsje op had, dan nam die er nog een  
(because every time he had a lager, he drank another one from early in the morning till late in the evening)

In Example 15 we made semantic/pragmatic paraphrases of missing links to make the narrative complete. The successive missing links was scored as only one gap. In Example 15 we scored two gaps in total.
A *jump* is scored when obligatory semantic/pragmatic information within one clause is not expressed, such as adverbs or non-obligatory arguments of the verb (see 5.3 and 5.4) (Example 16).

**Example 16**  
*Jump: violation of the Maxim of Quantity; too little information*  
*(PI-child; age 9;9)*

Esther:  
toen ik nog klein was, had ik een goudvis.  
(at the time I was little, I had a goldfish.

Esther→  
maar die werd veelste groot.  
(but he became too big)

Paraphrasis:  
but he became too big for the bowl he was swimming in  
too big in relation to what? → for the bowl (adverb of place)

In Example 16, the fish became too big ... for what?; essential information to understand the anecdote is missing.

A *jump* was also scored when obligatory semantic/pragmatic information of less than one clause is not clearly expressed. This occurs through the use of unclear adverbs, further referred to as *light adverbs* (there; then) (see 5.7 and 6.3 for other, morphological/syntactic errors in the use of adverbs) and unclear inanimate referents, further referred to as *light inanimate referents* (this; that). 'Light' means in this context semantically vague or semantically not opaque (Example 17).

**Example 17**  
*Jump: violation of the Maxim of Quantity; too little information; conversation topic is 'catching the guinea-pig'*(PI-child; age 9;9)

André:  
en dan komt tie zo naar mijn vader toe.  
(and than he comes so to my father)

Paraphrasis:  
en dan komt tie springend/snel naar mijn vader toe.  
(and than he comes hopping/quickly to my father)

so→ hopping/quickly (adverb of manner)

André→  
mijn vader kan hem niet vangen.  
(my father cannot catch him)

In Example 17, a light adverb of manner 'zo' (so) is used instead of a semantically more specific one. Although most of the message remains clear, and the sentence remains morphologically/syntactically correct, precise information is necessary in order to coherently link the sentence to the next one. Both *gaps* and *jumps* are counted in each interview.

12.6.2 Results: Violations of the Maxim of Quantity: too little information

Figure 12.10 shows that in the PI-children, except for the five-year-olds, the percentage of *gaps* is significantly higher than in the N-children.

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25 ANCOVA with the number of communicative contributions coded for topic as covariate; group effect (F(1,164)=5.29, p=0.023); age effect (F(4,164)=10.22, p<0.0001); no age*group interaction effect was observed (nine-year-old PI-children excluded).
The ability to transmit relevant information

Post hoc trend analysis shows that in the N-children the percentage gaps decreases linearly\textsuperscript{26} with age. Thus, with age fewer propositions are missing in the N-children (see also Roelofs, 1998:128). A linear decrease is not found in the PI-population, although we see a decrease with age if we exclude the five-year-old PI-children. We cannot explain why they do relatively better.

The PI-children have more difficulties in making the right presuppositions of what can be left unsaid: they leave too much implicit, frequently violating the Maxim of Quantity. The PI-children have difficulties in being explicit not only on the level of semantic/pragmatic information transmission, but also on the level of morphological/syntactic information transmission (see Chapter 5).

In case of a \textit{jump} the missed or unclear information is within one clause (Figure 12.11). When we compare Figures 12.10 and 12.11 we see that \textit{jumps} are more numerous than \textit{gaps} in both N- and PI-children. Unexpectedly, no significant group effect\textsuperscript{27} is observed. In the N-children the percentage jumps linearly decreases with age (see also Roelofs, 1998:128). A linear decrease of jumps\textsuperscript{28} is only found in the PI-children upto eight years.

\textsuperscript{26} ANCOVA (Polynomial contrast) with the same covariate. N-children(F(4,69)=8.44, p<0.001; Linearity: p<0.0001).

\textsuperscript{27} ANCOVA with the number of communicative contributions coded for topic as covariate; age effect: F(4,164)= 13.61, p=0.0001; no age\texttimes group interaction effect was found (nine-year-old PI-children excluded).

\textsuperscript{28} ANCOVA (Polynomial contrast): N-children: age effect F(4,69)=9.77, p<0.0001; Linearity: p<0.0001; PI-children: age effect (nine-year-olds excluded): F(4,94)=4.52, p<0.002; Linearity: p<0.0001; PI-children (nine-year-old PI-children included): F(5,113)=3.48, p<0.006; Linearity: p<0.007.
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12.6.3 Conclusion: Violations of Maxim of Quantity: too little information
The older N-children describe events more clearly than the younger N-children (Roelofs, 1998:129). This is not the case in the PI-children: they make significantly more gaps at all ages. Further research must be done to differentiate types of gaps and jumps that cause these violations of the Maxim of Quantity. Since all missing morphological/syntactic obligatory elements could have been counted as semantic/pragmatic jumps as well, the operationalisation procedure in order to differentiate these problems in both language areas needs further investigation.

12.7 Violations of the Maxim of Quantity: too much information

12.7.1 Research questions, definitions and operationalisations
Information was judged as too much information, and therefore as redundant/less relevant, when the information was already known to the interviewer because the child already mentioned it. Following Roelofs (1996), we coded an elaboration when the redundant information is in more than one clause, a reiteration when the redundant information is one clause and a repetition in case the redundant information concerns less than one clause.

Some of these types of irrelevant contributions, such as excessive elaborations, have been used in previous research (Rapin and Allen, 1983; Bishop and Rosenbloom, 1987; Bishop and Adams, 1989), since these types of incoherencies frequently were observed in LI-children with semantic-pragmatic disorder (see also Sahlén and Nettelbladt, 1993) (see 10.1). In PI-children on the autistic spectrum similar LI-symptoms have been reported (see Bishop and Rosenbloom, 1987; Wing, 1988).

An elaboration was scored if the child already provided the information requested by the interviewer (Example 18).
The ability to transmit relevant information

Example 18
Elaboration (PI-child; age 6;5)

Interviewer: dus jij bent nu # hoeveel jaar?
(thus how old are you # now?)
Alexander: zes.
(six)
Alexander: en dan word ik zeven.
(and then I will be seven)
Alexander: en dan word ik acht.
(and then I will be eight)

In Example 18, the last two contributions are redundant, since the information can be inferred from the first contribution.

A reiteration was scored if a clause was repeated (Example 19).

Example 19
Reiteration (PI-child; age 7;1)

Interviewer: en wat doe je dan aan dat bureau?
(and what do you do at your writing-table?)
Paraprasis gap: op een kras ik heel hard, dat die helemaal vies is.
(on one I scratch very hard, that it is all dirty)
Emiel: op één kras ik heel hard, dat die helemaal vies is.
(on one I scratch very hard, that it is all dirty)

In Example 19, one clause was repeated and scored as a violation of the Maxim of Quantity: too much information. Also too little information is given: where does 'één' (one) refers to? The added paraphrasis 'on my writing table I have got many writing-papers', was additionally scored as a gap (see 12.6). Thus, more than one violation can be found in the same part of the interview. Reiterations of a clause expressed by the N- and PI-interviewers was not judged as echolalia, although echolalia is reported to exist in severely disordered LI-children with semantic-pragmatic disorder (Rapin and Allen, 1983; Bishop and Rosenbloom, 1987; Sahlen and Nettelbladt, 1993) and PI-children on the autistic spectrum (e.g. Rogers-Adkinson, 1999).

A repetition was scored if a previous word/words or a phrase/phrases was repeated. This may be the case if children make no use of ellipsis when an elliptical form was expected (e.g. Bishop and Adams, 1989) (see 8.3 and 13.2), or if they made no use of conjunction reduction constructions (see 8.4) (Example 20), or repeated previously mentioned adverbs. If the repeated information was a non-fluent phonological, lexical or structural repetition and/or revision (called 'mazes' by Fletcher, Garman, Johnson, Schelleter and Stodel (1986)) these were not coded as repetitions.

Example 20
Repetition (PI-child; age 7;8)

Interviewer: en toen?
(and then?)
Daniella: toen zei ik hele lelijke woorden in mijn eigen tegen papa en tegen mama
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(then I said very bad words in myself to dad and mom)
Paraphrasis: toen zei ik hele lelijke woorden in mezelf (sociolect) tegen papa en Ø mama
(then I said very bad words in myself to dad and mom)

In Example 20, the preposition 'tegen' (to) is redundant and should have been elicited. This is then scored as a violation of the Maxim of Quantity: too much information.

12.7.2 Results: Violations of the Maxim of Quantity: too much information

From Figure 12.12 we see that the PI-children unexpectedly produce significantly fewer elaborations than the N-children, although the percentages are quite small in general. No linear age effects are found in either group.

Figure 12.12 The percentage elaborations (calculated over all communicative contributions coded for topic) expressed by 75 N-children (Roelofs, 1998) and 120 PI-children

From Figure 12.13 we see that the PI-children produce significantly more reiterations than the N-children. With age the percentage reiterations linearly decreases in both N-children (Roelofs, 1998: 129) and PI-children.

We checked whether a substantial part of reiterations could be judged as echolalia, i.e. imitating the PI-interviewers. This proved not to be the case, since PI-children expressed more reiterations of their own previous contributions.

29 ANCOVA with the number of communicative contributions coded for topic as covariate; group effect: $F(1,164) = 13.29, p<0.0001$; age effect: $F(4,164) = 3.11, p<0.017$; no age*group interaction effect was found (nine-year-old PI-children excluded).

30 ANCOVA (Polynomial contrast) with the same covariate.

31 ANCOVA with the number of communicative contributions coded for topic as covariate; group effect: $F(1,164) = 23.94, p<0.0001$; age effect: $F(4,164) = 8.39, p<0.0001$; no age*group interaction effect was found (nine-year-old PI-children excluded).

32 ANCOVA (Polynomial contrast): N-children: age effect $F(4,69) = 6.52, p<0.0001$; Linearity: $p=0.0001$; PI-children: age effect (nine-year-old PI-children included): $F(5,113) = 4.62, p<0.001$; Linearity: $p=0.0001$. 
The ability to transmit relevant information

Figure 12.13  The percentage reiterations (calculated over all communicative contributions coded for topic) expressed by 75 N-children (Roelofs, 1998) and 120 PI-children

From Figure 12.14 we see that the PI-children repeat significantly fewer words/word groups than the N-children. Although we see that with age the repetitions produced by the N-children decrease from age five to eight, for the whole group of N-children no linear age effect was found, nor was there a decrease with age in the PI-children.

Figure 12.14  The percentage repetitions over all communicative contributions coded for topic expressed by 75 N-children (Roelofs, 1998) and 120 PI-children

33 ANCOVA with the number of communicative contributions coded for topic as covariate; group effect: (F(1,164)=24.16, p<0.001); no age- or age*group interaction effect was found (nine-year-old PI-children excluded).

34 ANCOVA (Polynomial contrast) with the same covariate.
That the PI-children produced fewer repetitions compared to N-children fits into their overall tendency to be rather implicit with respect to the information transmission within communicative contributions. Whereas N-children are frequently too clear, the PI-children are not, as they often produce contributions that are not complete, correct and intelligible at all.

12.7.3 Conclusion: Violations of the Maxim of Quantity: too much information

The PI-children produced significantly fewer elaborations (more than one clause), more reiterations (one clause) and fewer repetitions (within a clause) than the N-children. At first glance these results seem contradictory. However, these results all point to the same underlying semantic/pragmatic disability in producing new, relevant information.

The N-children produce more elaborations and tend to be too clear. This way they increase the chance that they say new things that are predictable on the basis of what has been said before. Many PI-children on the other hand keep the output frequently as minimal as possible (see 10.5 and 11.7), reducing the chance to make elaborations. This result is unlike earlier reports that signalled many instances of elaborations in LI-children (Rapin and Allen, 1983; Bishop and Rosenbloom, 1987; Sahlén and Nettelbladt, 1993; Bishop and Adams, 1989) and in PI-children (Bishop and Rosenbloom, 1987; Wing, 1988).

Although most instances could not be judged as echolalia, the PI-children produced more reiterations than the N-children. This is in line with previous results (Adams and Bishop, 1989) and is related to the remarkably high proportion of topic holds (see 12.1). The PI-children may use reiterations as floor-holding strategy. An underlying information processing problem on the memory level (see 2.3.1) might also cause PI-children to 'forget' what they just expressed, when more than one clause has to be remembered. They therefore repeat what has just been expressed, unable to differentiate between old and new information.

The PI-children produce fewer repetitions within a clause than the N-children. On a local level, memory problems might be less obvious. The most plausible explanation is that the PI-children show low morphosyntactic complexity (see 8.4 to 8.6), more short turns (see 10.4), and produce less new information (see 12.1), reducing the chance of giving too much information on a local level.

12.8 Violations of the Maxim of Manner/Quality

12.8.1 Research questions, definitions and operationalisations

The Maxim of Quality is violated when ambiguous information is expressed. This violation was scored when children gave information that was in contrast with earlier information or when children gave false information (e.g. a lie; a fantasy), mainly due to a lack of world knowledge or a wrong presupposition (e.g. Bishop and Adams, 1989). Contributions to a conversation should not be knowingly false or lack adequate evidence. Young N- and PI-children, however, whose powers of
reasoning and of discriminating between fact and fantasy are yet immature, may have difficulties in following this Maxim (Example 21).

**Example 21**  
Violation of the Maxim of Manner/Quality: ambiguous information (PI-child; age 8:2)

**Interviewer:**  wat vind jij grappig aan een dolfijn?  
(that do you think is funny about a dolphin?)

**Child:**  dat ze mij zo leuk vinden.  
(that they like me so much).

In Example 21, the PI-child wrongly – although very creatively – presupposes that all dolphins like her.

In some cases this type of violation was scored when the information was not only not true, but also socially inappropriate (Example 22).

**Example 22**  
Violation of the Maxim of Manner/Quality: ambiguous and socially inappropriate information (PI-child; age 7:8)

**Interviewer:**  wat doe je op straat?  
(what are you doing on the street?)

**Emiel:**  <eh> krijten en poepen op de straat, en scheten en reten en poepies.  
(<eh> chalking and shitting on the street, and winding and arses and shits).

In Example 22, the PI-child expresses that he frequently shits on the street, and so on, which is not impossible, but hopefully not true. This last type of violation could has been scored separately by Bishop and Adams (1989).

**12.8.2 Results: Violations of the Maxim of Manner/Quality**

From Figure 12.5 we see that the PI-children more frequently violate the Maxim of Manner/Quality by giving significantly more ambiguous information than the N-children. With age a linear decrease is found in both N-children (see also Roelofs, 1998:129-130) and PI-children.

---

ANCOVA with the number of communicative contributions coded for topic as covariate; group effect: \(F(1,164)=34.93, p<0.0001\); age effect \(F(4,164)=6.55, p<0.0001\). no group*age interaction effect was found. (nine-year-old PI-children excluded).
12.8.3 Conclusion: Violations of the Maxim of Manner/Quality

The PI-children clearly have difficulties in following the Maxim of Manner/Quality, as they give significantly more ambiguous and contradictory information than the N-children. When contradictory information is given, the PI-children may not remember what they said just before, do not know what to believe is true or do not remember what happened exactly in the experiences they describe.

When untrue information was given as if it were the truth, PI-children frequently described some fantasy, such as 'I can walk on the wall', as if it was real to them. In PI-children the ability to separate real experiences from fantasy may be more problematic than in the N-children and normally developing children in general.

12.9 General conclusions: the ability to transmit relevant information

The results of the analysis of topic management and coherence are in line with previous results that show that in general the transmission of information in interviews with PI-children is less efficiently organized.

The PI-interviewers' stimulating effort by using the strategy of topic shading with respect to topic management is comparable to the stimulating guidance mentioned earlier. That is making longer pauses, giving more feedback and asking more pre-requests in order to (pre)activate a semantic field. However, despite this extra support, the PI-children show disabilities in the management of conversational topics, especially in the ability to maintain a conversational topic, talking about a certain topic and expressing more new, relevant details.

We know from Roelofs (1998:121) that N-children in this age range are expected to make relatively many violations. The N-children do not yet have an adult competence, and have not acquired those Theory-of-Mind skills necessary to take
The ability to transmit relevant information into account the listener's point-of-view and knowledge of the world. For instance, children have to learn that they have to be explicit about the place and time of a certain event (Hickmann, 2003). The ability to link sentences coherently is one of the major developments during the school years and in the age range studied (e.g. Bishop and Adams, 1989; Roelofs, 1998).

With respect to coherence, we give an overview of the violations of the different Maxims in Table 12.4. There the contextual yes/no implications are omitted since these are not violations of the Maxim of Relevance (Figures 12.5 - 12.15, except for Figure 12.9). When we look at all violations that can be made within one interview calculated over all communicative contributions, we see that within the age range studied the N-children have relatively fewer violations (mean 45%) of a certain Maxim, whereas the PI-children have far more (mean 56%) in the conversational interview genre (see also Roelofs, 1998:126). All differences were significant for each Maxim, except for the amount of jumps, calculated over all communicative contributions coded for topic.

Table 12.4 Mean total percentages of violations of the different Maxims (calculated over all communicative contributions coded for topic) in the N-children and PI-children (4;0 to 8;11 years)

<table>
<thead>
<tr>
<th>Violations of the Maxims</th>
<th>N-children</th>
<th>PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Violations of the Maxim of Relation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>unmarked topic shift</td>
<td>3 %</td>
<td>7 %</td>
</tr>
<tr>
<td>ignoring initiation</td>
<td>2 %</td>
<td>5 %</td>
</tr>
<tr>
<td></td>
<td>1 %</td>
<td>2 %</td>
</tr>
<tr>
<td>2. Violations of the Maxim of Relevance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>different content</td>
<td>6 %</td>
<td>9 %</td>
</tr>
<tr>
<td>different intention</td>
<td>3 %</td>
<td>4 %</td>
</tr>
<tr>
<td></td>
<td>3 %</td>
<td>5 %</td>
</tr>
<tr>
<td>3. Violations of the Maxim of Quantity: too little information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gap</td>
<td>21 %</td>
<td>22 %</td>
</tr>
<tr>
<td>jump</td>
<td>6 %</td>
<td>7 %</td>
</tr>
<tr>
<td></td>
<td>15 %</td>
<td>15 %</td>
</tr>
<tr>
<td>4. Violations of the Maxim of Quantity: too much information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>elaboration</td>
<td>14 %</td>
<td>12 %</td>
</tr>
<tr>
<td>reiteration</td>
<td>4 %</td>
<td>3 %</td>
</tr>
<tr>
<td>repetition</td>
<td>4 %</td>
<td>6 %</td>
</tr>
<tr>
<td></td>
<td>6 %</td>
<td>3 %</td>
</tr>
<tr>
<td>5. Violations of the Maxim of Manner/Quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ambiguous/ false information</td>
<td>2 %</td>
<td>5 %</td>
</tr>
<tr>
<td>Total violations</td>
<td>46 %</td>
<td>56 %</td>
</tr>
</tbody>
</table>
The higher frequency of violations of the Maxim of Relation and Relevance found in the PI-children as compared to the N-children show the PI-children’s difficulties in giving coherent, relevant responses. A coherent, relevant response must contain coherently connected new information. These results confirm the earlier findings related to responsiveness that signalled a relatively higher amount of minimal responses produced by the PI-children (see 11.7). The PI-children more frequently produced unmarked topic shift or ignored initiation of the interviewer. The topic under discussion expressed by the PI-interviewers frequently was totally ignored by the PI-children.

The relatively high frequency of violations of the Maxim of Relevance shows that the PI-children also relatively more frequently gave answers that differ from the content or the pragmatic intention expressed by the interviewer, and thus are not coherently linked. The topic under discussion expressed by the PI-interviewers was not, or only partly understood, by the PI-children, or they had difficulties in computing the pragmatic intention of implicitly formulated requests.

The other types of violations are not only related to responsiveness, but give an indication about linking successive contributions coherently in extended discourse (see 11.5). Although the PI-children produced a comparable amount of extended discourse with a narrative character as the N-children, the PI-children proved to have severe difficulties in linking these narrative contributions coherently. They frequently gave not enough explicit information or false/contradictory information that sometimes even was socially unacceptable, when they used swear words or taboo words.

Coming back to the proposed hierarchy of Maxims (see 12.2), we showed that violations of the Maxim of Manner/Quality, when a child gives ambiguous/false information (5) is more semantically/pragmatically marked than when a child gives too much, but clear information (4). It was also suggested that with age the most severe violations will decrease more rapidly than the less severe violations (Roelofs, 1998). With age respectivley the Maxims of Relation (1), Relevance (2) and Manner/Quality (5) decrease at a higher rate than the Maxim of Quantity (3/4) in both populations. This finding confirms that violations of the Maxim of Manner/Quality are more severe than violations of the Maxim of Quantity.

We computed the percentage of all types of violations over all communicative contributions coded for topic. This includes the 50-T-units and the elliptical answers that together form most of the children’s speaking time (Figure 12.16). First, the PI-children violate the Maxims significantly more than the N-children. With age the percentage violations linearly decreases in the N-children and PI-children only if we exclude the nine-year-old PI-children; no difference in performance between the

36 ANCOVA with the number of communicative contributions coded for topic as covariate; group effect: F(1,164)=32.00, p<0.0001; Age effect F(4,164)=49.40, p<0.0001. No age*group interaction effect is observed (nine-year-old PI-children excluded).

37 ANCOVA (Polynomial contrast) with the same covariate: N-children: F(4,69)=33.77, p<0.0001; Linearity p<0.0001; PI-children (nine-year-olds excluded) F(4,94)=29.94, p<0.0001; Linearity p<0.0001; PI-children (nine-year-old included F(5,113)=26.88, p<0.0001; Linearity p<0.0001.
The ability to transmit relevant information

eight- and nine-year-old PI-children is found. With age children in both groups become more able to avoid incoherencies and irrelevant information transmission. With age the communicative contributions are more correctly coherently connected to the contributions of the interviewer and to contributions previously mentioned by the child, fitting more appropriately into the ongoing conversational topic. This measure may be a very good marker for semantic-pragmatic difficulties.

Figure 12.16 The mean total percentage of all violations (calculated over all communicative contributions coded for topic) expressed by 75 N-children (Roelofs, 1998) and 120 PI-children

<table>
<thead>
<tr>
<th></th>
<th>4 yrs</th>
<th>5 yrs</th>
<th>6 yrs</th>
<th>7 yrs</th>
<th>8 yrs</th>
<th>9 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-chi: % all violations</td>
<td>68</td>
<td>55</td>
<td>41</td>
<td>33</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>PI-chi: % all violations</td>
<td>86</td>
<td>66</td>
<td>47</td>
<td>42</td>
<td>38</td>
<td>38</td>
</tr>
</tbody>
</table>

In sum, although in general school-aged N-children still make relatively many violations compared to adults, the PI-children have significantly more semantic/pragmatic difficulties in the ability to transmit relevant information than the N-children. The PI-children frequently show insufficient management of the conversational topic and violate the different Maxims significantly more frequently, reflecting difficulties to link contributions coherently.