The Development of Narrative Skills: Responses to the Task of Describing Social Interaction

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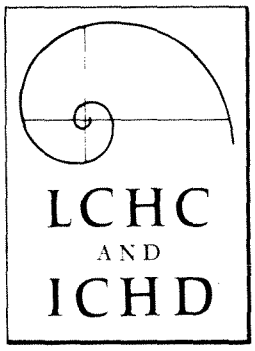

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This paper reports the results of a pilot study investigating children's understanding and description of social interactive episodes. One kind of knowledge that would appear critical for acting in a social world is the understanding of social interactive strategies, that is, ways of achieving goals through social interaction. Identification of the skills related to such understanding is a new problem so our intention in the present study was to develop procedures for interviewing children and for analyzing the resulting protocols. Recent work in the study of social cognition has begun to make use of the concepts and methods used for studying cognitive development (Shantz, 1975). Our work draws from research on story analysis (Mandler & Johnson, 1977; Rumelhart, 1975) and story recall by children (Brown, 1976) but our interest in social interaction has confronted us with problems which are, in some ways, unique to this domain.

Our study takes advantage of a corpus of videotaped skits produced by Children's Television Workshop for telecast on Sesame Street. The skits present encounters between two puppet (actually "muppet") characters, Bert and Ernie, and illustrate various interactive strategies. The interactions between these characters are often highly complex and interpretable on many levels yet the skits are attractive to all, even to the preschoolers who are, in fact, the intended audience. Thus the skits are valuable stimulus materials for exploring children's comprehension and recall of social

interaction.

In the present study, we showed one of these video-taped skits to children, and then used several tasks to explore their understanding. We found, in the course of collecting and analysing the data, that two kinds of questions came into focus. First, we became concerned with how to represent the skits themselves, that is, with describing the social interactions contained in the stimulus materials. Second we became concerned with the data collection methods -- in particular with the social interactions between the interviewer and subject which were the source of our data. In this report we will discuss our findings with these two questions in mind.

Because the plot structures of the skits are important for understanding both their value as stimulus materials and the problems which the data presented us, we will provide here a brief synopsis of the skit we used. The pilot work made use of one two minute skit entitled: "Ernie Shares Bert's Cookie." The full transcript of the skit is given in Appendix 3. Briefly the story goes as follows: Bert is about to eat a cookie that he had been saving all day when Ernie bursts on the scene, sees the cookie, and decides he wants it. Bert insists it is for him alone but Ernie begins trying to convince Bert to share it. Ernie argues (in a suspiciously sincere tone) that if he (Ernie) had the cookie he would share it with Bert. Bert doubts that Ernie would so Ernie takes the cookie away and tells Bert he's going to prove that

he would. He asks Bert to pretend the cookie were his and to ask him if he (Ernie) would share the cookie with him (Bert). Bert reluctantly asks the question. Ernie answers that he would be happy to share the cookie. He breaks it in half, gives half to Bert, and begins eating the other half as he walks off. Bert is left dumbfounded. Ernie returns momentarily to ask Bert if he would share his half a cookie. Bert screams.

It is not only the plot structure of the Bert and Ernie skits that is intriguing. They are also well acted -- there is a naturalness and sense of improvisation to the interactions. By being enactments of believable (though comical) events, rather than narrative descriptions, they seem to offer attractive stimuli which are at least a step closer than written or spoken stories are to real life. Of course, the skits are framed as short self-contained stories, and share many characteristics in common with narrative stories -- i.e., clear beginnings and endings, no introduction of irrelevant information, etc. -- which make them very different from videotapes of ordinarily occurring interactions. Nevertheless, they lack any statements about the characters' goals or thoughts besides those mentioned by the characters themselves (and therefore not always to be trusted).

While the skit was not itself a narrative, it contained a recognizable and tellable story. It seemed, therefore, that retelling the story would be a reasonable task to ask subjects to carry out. At the same time, however, it seemed

that the task of constructing a verbal narrative about perceived events might make demands that are independent of recall and comprehension. Accordingly, we tried out other procedures for tapping recall and comprehension of the skit. We asked the subjects to reenact the skit using handpuppets representing Bert and Ernie and interviewed them directly about what the characters were doing at various points in the skit. We were interested in both the similarities and the differences in recall and comprehension displayed in subjects' responses to these three tasks (narrative retelling, reenactment and interview).

Our study was exploratory and the provisional goals we began with are not the same as those we have now. First, we did not have an adequate representation of the social interaction contained in the skit. It now seems that a prerequisite for studies using materials such as the Bert and Ernie skits is a theory which would explain the complexities peculiar to stories containing interactions between two characters. Second, our assumption that retelling and reenactment would be clearly understood tasks for our subjects is questionable. It appears that for the younger children the social interaction with the interviewer is a problem (possibly unrelated to understanding the social interaction between Bert and Ernie) in a way that it is not for the older children. That is, the task for the two age groups appears to have been different. Thus, the children's responses to the social interactions in both the presented skit and the

interview situation itself provide sources of evidence about children's developing knowledge of social interactions. With these two issues in mind, we can turn now to the actual study and some of the findings that have led us to focus on these issues.

Method

Subjects

Thirty-two children from several New York City schools participated in this study. There were 16 children in each of two age groups. The younger children ("five year olds") ranged in age from five years, four months, to six years, five months with a mean age of five years, 10 months. The older children ("10 year olds") ranged in age from nine years, six months to ten years, eight months with a mean age of ten years, one month. There were five boys and 11 girls in the 5 year old group and equal numbers of boys and girls in the 10 year old group.

None of the 10 year olds but 13 out of 16 of the 5 year olds reported that they currently watched Sesame Street. Eleven children out of each group reported that they had seen the "cookie" skit on T.V. All but two of the subjects could readily identify Bert and Ernie after being shown the skit once.

Procedure

The children were interviewed individually. The entire session with each child was audiotaped and later transcribed. The experimenter told the child that they were going to see

a T.V. show and after it was finished, she wanted the child to tell another adult, who was not there (the interviewer), what had happened in the show. The child and experimenter watched the two minute skit twice. The interviewer then entered the room and the experimenter reminded the child that the interviewer did not get to see the skit and the child could tell him or her about it. There were two interviewers: a male interviewed the 10 year olds and half of the 5 year olds and a female interviewed the remainder of the 5 year olds. The interviewer initiated the first of two tasks, either Acting-out or Narrative. Order of these two tasks was counterbalanced. For the Narrative task, the child was asked to tell the story in his/her own words. For the Acting-out task, the interviewer brought out two 12 inch hand puppets of Bert and Ernie and asked the child to act-out the story she/he just saw, using the two puppets. The interviewer modelled the Acting-out task by putting the two puppets on his/her hands and pretending to have them talk to each other. As the child acted-out the story for the interviewer, the experimenter recorded the child's movements and physical actions of the puppets on a check-sheet.

Following these two tasks, the comprehension interview was conducted. The interviewer told the child that she/he would like to watch the show on T.V. too, and suggested that if there were something that the interviewer didn't understand about the story, she/he would stop the tape and ask the child about it. The child, interviewer and experimenter

watched the skit again, and the interviewer stopped the video tape at three points (marked * on the Master List, Appendix 3). The interviewer asked the following questions at these three points:

1. "Why did Ernie say "...?" (referring to what Ernie said just before the tape was stopped)
2. "What is Ernie trying to do?"
3. "What is Bert trying to do?"
4. "How does Ernie feel now?"
5. "How does Bert feel now?"

Questions 2 and 3 were not asked at the third stopping place. Either the interviewer or experimenter would ask additional questions if it appeared that the child was trying to explain something but was having difficulty.

Coding of the Narrative and Acting-out Task

A coding system was devised to provide measures of three basic aspects of the protocols: First, the amount and fluency of the child's production; second, the extent of use of various narrative and acting-out devices and style; third, the relationship between the propositions in the stories each child told and the events in the skit that each child viewed on the video tape. Appendix 1 provides a detailed description of the coding procedures. Twelve out of the 64 stories (narrative and acting-out) were coded independently by two experienced coders in order to obtain a measure of reliability for each aspect of the coding system. What follows here is a brief description of what was coded for in the

children's stories along with the reliability score obtained for each item.

In the first phase of the coding, the children's protocols were broken down into separate propositions. These propositions were recorded on a coding sheet where connectives, dysfluencies, and interviewer utterances were also noted.

Two criteria were used for determining the boundaries between propositions. First, the Master List of Events (Appendix 3) was used as a guide. The Master List consists of all the verbal utterances of Bert and Ernie, and their gross motor movements (for example, characters entering and exiting). The utterances in the children's stories are numbered as separate propositions when the utterance describes a separate numbered event on the Master List. The second criterion used to determine propositions in the children's stories are the connectives (such as "and", "then", "so"). There was 95.1% reliability between the coders on the number of propositions in the children's stories.

For each proposition, there was 97.8% agreement that it had a connective, and where there was agreement that a proposition had a connective, there was 98.1% agreement as to what the connective actually was.

The child's difficulty producing a proposition is coded for in two ways: whether it had a "false start" and whether it had any hesitations of two seconds or more. There was 96.7% agreement as to whether a proposition had a false start. The reliability in determining the occurrence

of two second hesitations was not tested since the identification of these pauses was actually made at an earlier transcription phase.

Any questions or comments by the interviewer that precede a child's utterances were also coded. There was 98.6% agreement as to whether a proposition had any interviewer utterances preceding it. We coded for six types of interviewer comments and probe questions:

1. Choice questions (eliciting a yes/no response)
2. Specific product questions (eliciting a particular piece of information; e.g. "What did Ernie say then?")
3. General product questions (eliciting general information about what happened next.)
4. Repetition or reformulation of child's previous utterance(s).
5. Supportive statements such as exclamations, praise, and simple acknowledgements (e.g., "uh huh")
6. Instructions

There was 72.2% reliability on determining the number and type of interviewer probes and comments before an utterance. Often there were several probes preceding an utterance so there was an additional reliability check made on the coding of the final probe before the child's proposition. In this case, there was 79.6% reliability on the type of probe.

In the second phase of coding, the child's proposition was coded for its "form". There were five form categories:

a. Action- physical movements of the two puppets and sound effects (e.g. crunching sounds to imitate eating a cookie)

b. Direct dialogue- propositions which represent utterances of the characters as if the character were speaking.

c. Framed dialogue- utterances of a character introduced by an appropriate frame to signal the speaker (e.g. "Bert said 'Hello'.")

d. Narrative- propositions which report about or describe a verbal or nonverbal event from the skit.

e. Inference- propositions that do not refer to specific events in the skit but that are based on the events in the skit i.e., the child uses information to make a statement that is not explicitly part of the skit.

There was 95% agreement on the form of the children's propositions.

The final step of coding involved determining what event or set of events in the skit was being referenced by the child's proposition. Propositions did not always refer to single events but often appeared to describe larger segments of the skit. In order to code propositions which did not refer to single events we broke the skit down into 13 "episodes".

The principle by which these larger chunks were

determined was based, in part, on Mandler and Johnson's (1977) story grammar and on some pilot work. Since Mandler and Johnson developed their system by analyzing adult-narrated stories and folk tales, their story grammar could not be applied directly to the Bert and Ernie skit, which is presented visually and through direct dialogue. Therefore, in order to describe an appropriate narrative story structure for this skit, we first of all showed the videotape to seven adults. After viewing the story twice, they were asked to give a narrative account of the story to a third person. We compiled these seven adult narratives into one composite narrative, eliminating intrusions and propositions which were not mentioned by at least two subjects. The composite narrative which represents an "adult" view of the story contained in the skit is found in Table 1.

Insert Table 1 about here

Mandler and Johnson's system for story analysis was then applied to the resulting narrative and a hierarchical representation was derived (see Figure 1.). The major

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Insert Figure 1 about here

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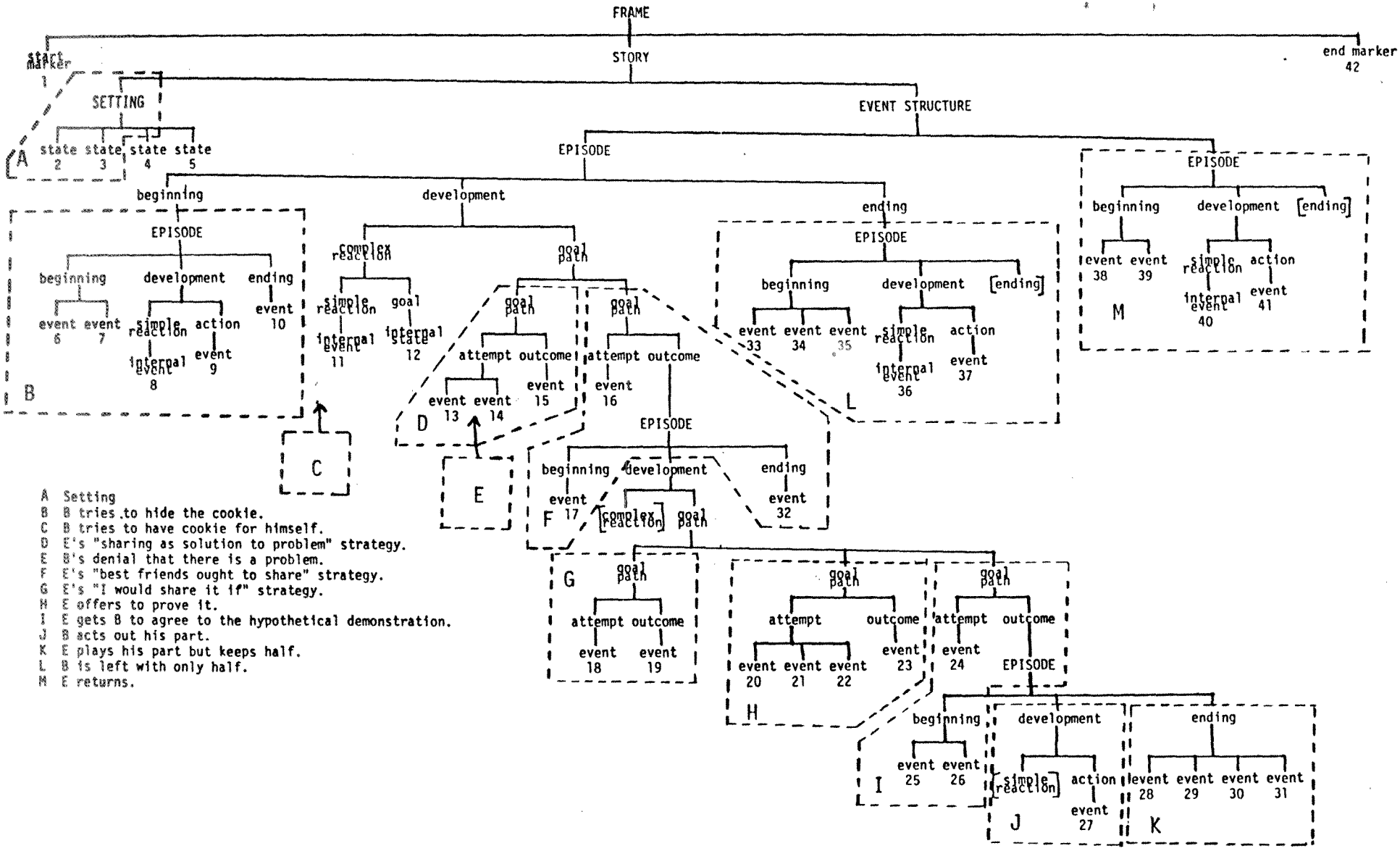
groupings in this representation were used to define segments (labeled A through M). We will refer to these segments as "episodes" although, of course, they do not always coincide

Table 1:

COMPOSITE ADULT NARRATIVE RECONSTRUCTION OF COOKIE.

1 This is a scene from the children's TV show, Sesame Street.
2 There are two characters, Bert and Ernie.
3 B has a cookie in his hand.
4 He's saved it all day for himself.
5 Just as he's getting ready to eat it
6 E comes along.
7 E asks B what it is that he has.
8 But B wants the cookie for himself
9 so he turns away and tries to hide it from E.
10 E sees that B has a cookie
11 and he wants to eat it.
12 So he tries to get B to share it with him.
13 E says to B that they have a problem since both of them want the cookie.
14 He then suggests that the answer is to share it.
15 But B doesn't like that idea.
16 So E suggests that they should share the cookie because they're best friends.
17 But B still refuses saying that he's been saving it all day for himself.
18 So E tries to convince B that if he had the cookie he would share it with B.
19 B refuses to believe it
20 so E offers to prove it to him.
21 He takes the cookie
22 and asks B to pretend the cookie was E's.
23 At first B just accuses E of taking the cookie
24 but E says he just wants to demonstrate what he would do if the cookie were his.
25 B is reluctant but goes along with E.
26 E tells B to ask him if he will share the cookie.
27 So B says "E, would you share that cookie with me?"
28 E says he'd be happy to share it.
29 He breaks the cookie in half.
30 He gives half to B
31 and begins immediately to eat his half.
32 E reminds B that sharing is what friends are for.
33 E thanks B
34 and walks off.
35 B is left standing there with half a cookie.
36 He is confused about how he ended up with half a cookie when he started out with a whole one and didn't intend to share it.
37 As he stares at his cookie dumbfounded and chagrined,
38 E comes back in.
39 He asks B if he would share that half a cookie with him.
40 B's finally had it.
41 He screams.
42 That's the end of it.



A Setting
B B tries to hide the cookie.
C B tries to have cookie for himself.
D E's "sharing as solution to problem" strategy.
E B's denial that there is a problem.
F E's "best friends ought to share" strategy.
G E's "I would share it if" strategy.
H E offers to prove it.
I E gets B to agree to the hypothetical demonstration.
J B acts out his part.
K E plays his part but keeps half.
L B is left with only half.
M E returns.

Figure 1: Structural Representation of the Cookie Skit Narrative.

with the occurrence of episodes as defined by Mandler and Johnson. The events on the master list which corresponded to these episodes were then marked off (see Appendix 3.).

It will be noticed that episodes C and E are not represented in the story structure. These events, which were not typically reported by the adult subjects, were Bert's counter strategies to Ernie's attempts to get him to share the cookie. While Mandler and Johnson state that "conversational stories lie outside of the domain of the grammar..." (p. 114), the fact that adult subjects omitted these events suggests that they formulated the story as having one main protagonist (Ernie). While the skit is an interaction between two characters, the story, as reconstructed by adults, mainly involves Ernie's attempts and their outcomes. It seems possible that this single-protagonist point-of-view phenomenon is a rather general feature of narrative retelling of interactions, though this speculation needs further study.

We have added a superordinate node to the structure which we call the FRAME. The first and last utterances of many adult story-telling sessions seemed to be not part of the story but rather seemed to serve a social interactional purpose between the adult subject and the interviewer--the subject would commonly tell the interviewer what he was about to do and then let him know when he was finished. These utterances did not appear to be part of the story but were a part of the story-telling. These framing devices also appear on the master list as "events" 1 and 101.

A proposition was coded with an episode letter instead of an event number when the proposition summarized or reformulated a series of events in one episode. Often a proposition summarized events in more than one episode, and in these cases, the proposition was coded for the segment that it covered (e.g. B-D). This coding did not imply that a child recalled everything within such a segment but that the child provided the gist of the events within these episodes. There was 90.6% reliability on coding the level of information being referenced in the propositions, i.e. whether a proposition referenced a separate event or an episode. Having decided that a proposition referenced an event or an episode, there was then 80.2% agreement as to what the actual number (event) or what letter(s) (episode) the proposition referenced.

Coding the Comprehension Interviews

The following system was designed to provide a summary of the data obtained in the comprehension interviews. The children's explanations in terms of the internal states of the characters were coded by means of four, hierarchically-arranged "levels" of understanding. Internal states refer to thoughts, feelings, intentions, motives, traits, perspectives--any of the host of "mental states" which may be said to characterize an actor. The four levels which were adapted from Flapan's (1968) and Selman's (Selman & Byrne, 1974) studies, are defined in Table 2.

Insert Table 2 about here

Table 2

Hierarchical Levels Used in Coding the Comprehension Interview

Level	Definition	Examples
0) Surface:	No reference made to mental states, even when probed. a) "Don't know" responses b) Behavioral or appearance features given in response to a question about internal states.	(How's Ernie feel?) "He ate the cookie and went away."
1) Internal:	Reference is made to <u>one</u> character's mental states such as feelings, intentions, etc.	"He's happy." "He wants the cookie."
2) Interpersonal:	Reference is made to one character's reactions to another character's internal state. (Note this may be implicit in the attempt to alter the perspective of another character, as in example).	"Ernie's trying to make Bert feel happy." "He wants to show Bert how to share."
3) Reflexive:	Reference is made to one character's (A's) perspective on another's (B's) reactions to his (A's) internal states (e.g. deception and impression-management).	"Ernie wants Bert to think that he's telling the truth..."

The comprehension interviews provide information about subjects' understanding of the interaction at the three points where the interviewer stopped the tape (indicated in Appendix 3)--1) at the outset of Ernie's "sharing" strategies, 2) during the development of the "hypothetical" episode, and 3) following Ernie's successful execution of the trick. We are thus "tapping in" to ongoing constructions by the subject at particular points in the story. The system defined in Table 2 was used to categorize the whole of the child's response at each of these three points in the skit. That is, although a series of questions was asked at each stopping point, answers to individual questions were not considered separately. Rather, the answers occurring at a particular stopping point were considered together and this group of answers were assigned a single number based on the "highest" level it passed where highest is based on the explicitly hierarchical nature of the system as defined. Accordingly, the final coding of a protocol in this system produces a single, highest-level score for each of the three segments covered in the interview.

There were two major reasons for coding each group of answers rather than each individual answer. First, the probing was relatively unstandardized. While most of the questions listed earlier were asked (unless the child answered it in the course of answering a prior question) often questions were asked spontaneously based on the child's responses in the manner of a clinical interview. Second,

an individual answer often did not contain sufficient information to be clearly interpreted at a particular level. Answers to other questions in the group were used to disambiguate it (as explained in Appendix 2). That is, a child's score for a particular stopping place would often be based on his/her answer to one of the questions but the other answers would provide the necessary evidence for what she/he meant.

The role of verbs. The central criterion for deciding the level of comprehension indicated in the child's response was the verb used in explaining the character's actions. Verbs vary in their semantic implications regarding the actor's state of mind, and the child's competent use of various complex verbs might be taken as an implicit signal of "higher level" role-taking. For example, the verb "persuade" suggests that one character is acting on the mental state of the other (level 2). The use of this verb can imply that the speaker has a level 2 concept. The conditions for making such an inference are discussed in detail in Appendix 2.

Reliability of the coding system. A sample of 6 protocols from the 5 year-old group and 6 protocols from the 10 year-olds were scored independently by two coders, using the four-level comprehension scoring system described above. There were 29 agreements and 7 disagreements (all of one level only) among the 36 responses scored, for an overall coefficient of agreement of .81.

Results and Discussion

We will present and discuss the results with respect to the two issues outlined in the introduction. First we will discuss the results bearing on our original concern, namely, (A) the children's understanding of the social interactions in the skits. Then we will present some results which concern (B) the social interaction of the interview itself and the children's response to the demands of that social encounter. Table 3 summarizes the measures which were applied to the protocols.

Insert Table 3 about here

A) Understanding the Skits

A series of t-tests showed no significant differences by subject sex for any of the Acting-out or Narrative measures. Differences between interviewers could not be tested as a factor, but are considered later in the discussion. The data were pooled across interviewer and sex for the main analyses.

The comprehension interview. The comprehension scores from the interviews yielded a clear age difference. The mean score (3 was the highest possible) for the five-year-olds was 1.23. For the ten-year-olds it was 1.96 ($t_{30}=7.04$, $p<.001$).

The retelling measures. For each of the nine parallel measures of Table 3, a three factor analysis of variance

Table 3

Summary of Measures Applied to the Comprehension and Retelling Protocols

The comprehension interview: The coding of the interview yielded a number for each subject representing his/her average score on the three interview points.

The retellings: The data from the narrative and acting-out protocols were analyzed together. Nine measures were derived from the coding:

1. Production: This was the number of propositions in the protocol. For the acting-out task, actions were counted as propositions only when they were not duplicated by a verbal proposition. Propositions which were answers to yes-no (type 1) probes were excluded.

2. Style: This was a measure of the extent to which an acting-out (as opposed to narrative) style was used in the protocol. It consisted of the percentage of the total number of propositions which were coded as either Direct Dialogue or Action.

3. Inferences: This measure was the percentage of the propositions coded as inferences.

4. Level: This was the percentage of propositions that were coded with numbers referring to specific events rather than with episode letters.

5. Connectives: This was the percentage of propositions preceded by a connective.

6. Logical connectives: The percentage of propositions preceded by a connective consisting of or containing the following words: so, because, but, to.

7. Dysfluencies: The percentage of propositions that contained either a false start (of either type) or a hesitation.

8. Probes: The percentage of propositions coded as being preceded by a probe of any kind. (Propositions preceded by more than one probe were not distinguished from those preceded by one.)

9. What Probes: The percentage of propositions which were preceded by a "wh" question (what, who) i.e. probe types 2 or 3.

was carried out, with task (Narrative vs. Acting-out) as a within-subjects factor, age as a between-subjects factor, and order of task as a between-subjects factor. We will discuss below only the results of primary interest for the two issues under consideration.

In this section, we briefly discuss the age trends of theoretical interest in these analyses. Several of the measures were expected to yield age differences and correlations with scores on the comprehension task. The results were generally disappointing however.

The Level measure was expected to give some indication of the extent the subjects were tied to repeating particular events as opposed to reformulating the story in larger or different chunks. The ANOVA for the Level measure resulted in no significant main effect or interactions for age. The propositions which had been coded with letters were recoded so that letters used to code formulations of some part of the story were separated from those which reported "new" events (consistent with but not actually occurring in the episode). This more fine grained coding did not result in a pattern that was different in any interesting way from the original results for Level.

ANOVA's for the number of logical connectives and inferences also did not indicate any age differences. For these aspects of the stories, however, the measures appeared to miss an actual difference which shows up with other methods of measurement. If instead of using the mean percentage

of propositions which were preceded by a logical connective, subjects are categorized as having used or not having used logical connectives, it is found that 81% of the older subjects used one of more of these connectives but only 31% of the younger subjects did. Likewise with propositions coded as inferences 81% of the older subjects made inferences but only 37% of the younger subjects did. These differences in story content did not show up in the analysis of variance primarily because of one of the younger subjects who performed at a level beyond most of the older subjects. There is limited evidence, then, that there may be some qualitative differences in the logical coherence of the stories of the older and younger children. Overall, however, the evidence for the expected age difference in the children's retellings of the skit is weak.

We had expected that comprehension of the interaction in the skit would be closely related to the retelling tasks. However, correlations between scores on the comprehension task and the nine recall measures (for both the 5 and 10 year old age levels) revealed few associations of interest. For the five-year-olds, the length of the story was correlated with comprehension. This may have resulted from shy children giving minimal answers in both tasks. Other significant correlations occurred but not in a systematic or interpretable manner.

Distribution of propositions. We also expected that differential distribution of propositions among the episodes

might provide a key to how children at different levels of comprehension structured the telling of their stories. We examined the distribution of propositions within episode to see if there were any clear differences attributable either to the task or the child's level of comprehension. We took a subsample of 16 children: 8 who had scored highest on the comprehension questions and the 8 who had scored lowest and had fewer than 30% of their propositions preceded by a probe. These two groups were, of course, distinguished by coming from different age groups. We counted the number of propositions falling in each of the episodes for both the Narrative and Acting-out task and summed these numbers within each episode for all eight subjects. In order to correct for the differential size of the episodes, the number of propositions per episode was divided by the number of events on the master list for that episode. We will call this figure the "proportion" of events reported. The mean proportion per episode for the four groups of stories is plotted in Figure 2. The similarity among the curves

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Insert Figure 2 about here

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is evident. While there appears to be considerable variation among the episodes in the extent to which they were emphasized, it also appears that this variation has little to do with the subjects' level of comprehension or to the task they were performing.

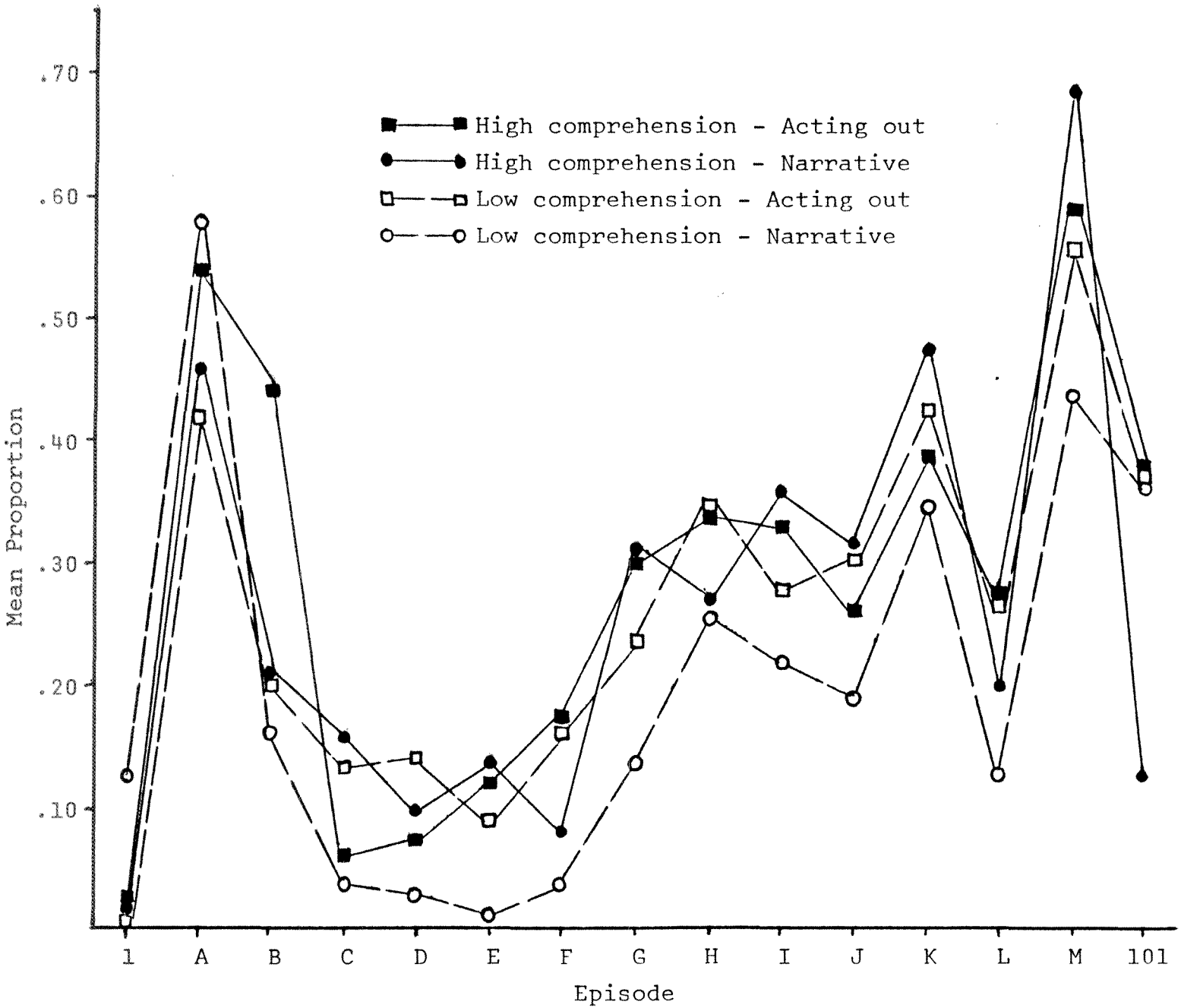

Figure 2: Proportion of events reported in each episode

The Analysis of story comprehension. The results of our analyses of the stories reported above were not consonant with our intuitive sense that the stories of the two age groups were very different in terms of their internal structure and coherence. Evidently, a more fine grained or differently conceived set of categories of analysis must be called for if differences between the stories are to be shown. To illustrate one kind of difference between the groups, we inspected their reporting of episode G in which Ernie argues that if the cookie were his, he would share it with Bert. Of the 16 older subjects, 12 clearly stated this argument and 10 of those made it clear that this point was what Ernie was intending to prove in the demonstration. Only 3 of the younger subjects clearly stated Ernie's hypothetical proposal and two of these indicated the connection of Ernie's claim to the demonstration. In other words, while the demonstration was reported by the younger subjects, just what it was a demonstration of was considerably less clear in their stories.

What appears to be necessary in order to code story protocols for the extent of their coherent reporting of interpersonal strategies is an analysis of the stimulus materials that represents the internal structure of the character's plans. One way of doing this would be to examine the distribution of propositions among the lower level categories within the story grammar episodes such as "simple reaction", "goal", and "outcome" (Mandler & Johnson,

1977). We expect that such a recoding of the data would still not capture the critical features of understanding the Bert and Ernie skits however, because story grammars are explicitly restricted to one character stories. The aspect of the skit that is most compelling and for which the comprehension interviews were coded was the interaction between two characters.

One way of describing the complexity that this skit presents to a viewer is in terms of one character's beliefs about the other character i.e., the "perspective taking" demands of the skit. Ernie gets Bert to believe that Ernie wants Bert to believe that Ernie would share. But actually Bert's belief (that Ernie wants...) is false. That is, Ernie's "demonstration" of his generosity is not motivated by his wanting Bert to believe anything about Ernie but rather by his wanting a pretext for walking off with half the cookie. The viewer would have to understand that although Ernie seems sincere and Bert believes he's sincere, Ernie is actually using Bert's belief strategically. The viewer would have to have a representation of Bert's belief about Ernie as well as a representation of Ernie's belief about Bert's belief about Ernie. The cookie story is not unique among the Bert and Ernie skits. Several of them contain this as well as other kinds of strategic maneuvering.

A representational system is now being developed by Bruce and Newman (in press) in which the interaction between plans of two characters and the beliefs of one character

about those of the other can be explicitly represented. The application of this system to several of the Bert and Ernie skits is now being attempted (Newman, in progress). The importance of being able to represent the characters' beliefs about each other (and their beliefs about the other's belief about themselves, etc.) is clear from the above analysis. In order to understand Ernie's plan (and many stories containing conflicting interacting plans), it is necessary to represent the discrepancy between the belief states of the characters.

This kind of analysis was used in coding the answers to the comprehension probes where three levels of reflexive awareness were used. At level three, the subject reported one character's (A's) awareness of B's awareness of A's state. An interacting plan's analysis of the skit reveals the need for what might be considered a fourth level. Take, for example, an answer given by a 10 year-old to the question: "Why did Ernie say 'Just ask me if I'll share it with you'". The child answered "He was trying to tell Bert, to make him understand how he felt about that he should share the cookie with him". This child represents (a) Ernie's intention that (b) Bert should believe that (c) Ernie had some attitude toward sharing. Notice that what is reported here is not Ernie's real plan but the plan Ernie wanted Bert to believe Ernie was undertaking. It does not mention Ernie's insincerity. This answer can be compared to that of another 10 year-old to the same question. This child answered: "He

wants to put Bert in his place and (hesitation) see, if Ernie gives Bert half the cookie then Bert will give Ernie half the cookie when Ernie gives his cookie back. If he does. He has a plan that he is going to crack the cookie, and give half to himself as if it was his cookie in the first place." This child begins describing Ernie's "virtual" plan as if it were the real plan (as in the first example) then explains that Ernie is somehow acting "as if". The embedding of the virtual plan in some real plan is not well articulated but this child is on the right track. The difficulty children have in explaining Ernie's real plan and the seductiveness of the virtual plan as a description of what is really happening points to the need for a way of representing conflict and deception in terms of having a reflexive awareness of others' beliefs. Before retellings and the child's comprehension of interaction can be expected to show a relationship, it will be necessary to develop a way of coding the stories which captures the events that are critical to the interactions between characters' plans.

To summarize briefly, the analysis we conducted of the development of comprehension and retellings of interaction showed strong age effects for comprehension, but indicated few effects for retelling. We now feel that the analysis we used for the retelling tasks failed to capture important features of the representation of such social-interactive episodes.

B) Children's Responses to the Retelling Tasks

While the initial goal of this research project was to find ways of assessing children's understanding and description of social interaction, we found, in analyzing the data, that we were learning more about the story telling tasks themselves. That is, the social interactions between the interviewer and the subject began to take on as much importance as the interactions between Bert and Ernie. In this section we will explore the relation between these two levels of analysis. We will begin by presenting the results of the various ANOVAs for the retelling measures with Task as an independent variable. We will then discuss the age differences that were found for measures that relate directly to the interaction between subject and interviewer. Finally, we will report some further analysis of the retellings that bears directly on the issue of the relation between the interactions in the skit and those between the subject and interviewer.

Task differences. Significant main effects ($p<.05$) were found for task on the following of the nine dependent variables:

i) number of propositions. Mean of 28.0 for the acting out task, 21.7 for the narrative task.

ii) style. In the acting out task 41.4% of the propositions were either actions or direct dialogue. In the narrative task only 6.1% of the propositions had this acting-out form. There was also an Age X Order interaction (described

below).

iii) inferences. Most of the inferences occurred in the narrative task (4.8% versus 1.6% of the acting-out propositions). There was also a Task X Age interaction such that for the older children the tasks were more differentiated (almost all inferences were in the narrative task) than for the younger children where the inferences were more evenly split between acting-out and narrative.

iv) connectives. These showed a pattern similar to the inferences. In the narrative task more propositions were preceded by a connective (68.8% versus 39.3% for acting-out). There was also a trend for the older subjects to differentiate the tasks in the use of connectives ($p<.10$), resembling the pattern for the use of inferences.

v) logical connectives. As a subset of connectives this measure also showed a task effect.

vi) dysfluencies. The acting-out task was slightly more fluent than the narrative task.

vii) level. There was a slightly higher percentage of propositions referenced to more than a single event in the narrative task.

viii) There was no task differences in the amount of interviewer probing.

The acting-out task resulted in the production of more propositions and these propositions were more fluently produced. Some proportion of the difference in number of propositions can be accounted for by the use of repetitions

in the acting-out task. A count of repetitions (often in the form of having a character reiterate some utterance) showed a slightly higher percent in the acting-out task (not tested for significance). There was also a greater use of propositions in the narrative which were coded with letters rather than numbers (the level measure). These results are at least consistent with the notion that the acting-out task led to the emphasis of specific events rather than the broader formulations emphasized in the narrative. It is possible that the dysfluency of the narratives is also accounted for by these "difficult" formulations.

The most obvious and easily interpretable difference between the two tasks was in style (use of actions and direct dialogue). This difference appears related also to the task differences in inferences and in connectives. Having puppets put on their hands and being instructed to act-out the skit had its predictable effect of the subjects' protocols. Since connectives are a narrative device it makes sense that they should tend to precede narrative and framed dialogue propositions and thus correlate (negatively) with the style measure. In fact, there were strong correlations between connectives and style for both age groups. Inferences also occurred primarily in the narrative task, though here there were no significant correlations with style.

Besides the strong main effect of task for the style measure, there was also an Age X Order interaction for style. This interaction is of interest for what it suggests about

the younger and older subjects' understanding of the task instructions. Table 4 presents the means for style for each

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Insert Table 4 about here

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of the eight cells. The task effect is clear with all of the means for acting-out being higher than any of the narrative means. The Age X Order interaction can be seen in the means for each group of subjects shown at the bottom of the table. Notice that there is no main effect for age. However, the age groups behaved quite differently on the tasks--their patterns are almost mirror images of each other. What processes could have resulted in this pattern of means? For the young subjects it appears that the first task had an influence on the second. That is, the narratives that followed the acting-out had more acting out style than the narratives that came first. The same is true for the narrative's influence on the acting-out in Order B. Thus Order A (with acting-out first) had more action and direct dialogue than Order B for the 5 year-olds.

For the older subjects, the first task did not have the same kind of effect on the second task. In fact, for Order B, the effect seemed to be in the opposite direction. The acting-out task which followed the narrative was more likely to be in the acting-out style than the one in Order A which came first. What may be happening here is that the older subjects are initially less comfortable with the acting-

Table 4

Means for Style (percent of action and direct dialogue propositions)

	Younger Subjects		Older Subjects	
	Order A N=8	Order B N=8	Order A N=8	Order B N=8
First Task	Acting-Out 47.1	Narrative 1.3	Acting-Out 28.4	Narrative 0
Second Task	Narrative 21.1	Acting-Out 29.4	Narrative 2.1	Acting-Out 60.6
Means for each group	34.1	15.3	15.3	30.3

out task than with the (probably more familiar) narrative task, but understand the demands of acting-out better when the task is presented in contrast to the narrative task. That is, instead of the instructions for the second task being overridden by the first task (as with the younger subjects) the older subjects can use their knowledge that these are two different tasks in order to more clearly interpret the acting-out instructions in Order B. This interpretation is consonant with the fact that the instructions for the second task were not given until after the first task (actually, the second task was not typically mentioned until the first task was finished). This interpretation would suggest that for the older subjects listening to task instructions is more like problem solving. They are more active in their attempts to interpret what is being asked of them (cf. Markman, 1977). Where the process of interpreting instructions is different across groups then the tasks themselves would in all likelihood be different for the two groups. The age X task interactions for use of inferences and connectives also support this point.

Age differences. Significant main effects ($p<.05$) were found for age on the following variables:

i) Number of Propositions: mean of 20.4 for the younger subjects; mean of 29.3 for the older group.

ii) Dysfluencies: younger group 18.4%; older group 12.4%.

iii) Probes: younger group 39.2%; older group 7.7%.

iv) Wh-probes: younger group 17.8%; older group 0.3%.

These results seem to indicate that the central difference between the Age groups was in the ease with which the stories and acting were produced. The older group produced longer stories with fewer dysfluencies and with less encouragement in the form of experimenter probes.

Significant negative correlations were found for the younger group between number of propositions produced and the percentage of propositions that were preceded by a probe (but not for the older group where, in any case, the amount of probing was very low). The correlations were -0.53 for both narrative and acting-out. This would suggest that experimenter probing was responsive to the child's inability or unwillingness to produce a retelling spontaneously. For the younger group the only significant correlation involving dysfluencies was with amount of probing in the narrative task, where there was a negative correlation of -0.53. Possibly, in this task at least, the probes provided a frame for more fluent utterances. Answering a question may be easier than producing a string of utterances spontaneously.

Since there were two interviewers interviewing the younger group, and only one of these interviewed the older group, a test was run to see if the age differences could simply be an interviewer effect. Where a t-test showed significant differences between the two experimenter-determined groups of younger subjects, the direction of these differences was opposite to the age differences. That is,

Interviewer 2, who interviewed the older subjects, elicited fewer propositions from the younger group and used more probes than Interviewer 1. Besides indicating that the age differences are not to be accounted for by interviewer bias, these results suggest that at least the younger subjects are sensitive to the interviewer and this sensitivity may account, in part, for the correlation between number of propositions and probes.

The age results for amount of probing suggest that the tasks were quite different for the younger and older subjects when the task is considered as a social interaction between subject and interviewer. For the younger subjects, the story telling (both narrative and acting-out) was much more a (reluctant) conversation. The older children when asked to tell the story went ahead with very little support (less than 1% of their propositions were elicited by wh-questions). It is consistent with the idea that the social interaction between the subject and interviewer was more critical for the younger than older subjects that there was significant interviewer effect for the 5 year-olds. It remains to be tested whether interviewer effects would be less for older children.

Children's management of two levels of interaction. Narrating or acting-out a story for someone can be described as involving two levels of goal directed activities: there is the goal of communicating a set of events to a listener, and there are the goals of the characters within the story

itself to be conveyed. The problem of differentiating these two levels of interaction--the telling and the told about--is a generic one in narrative. These two aspects of the task are discussed below to highlight some of the skills that are necessary to reproduce a story for someone and to illustrate how the experimental situation itself became a topic of our analysis. In this section approximate frequencies are cited but these are impressions rather than quantitative findings.

Where the story to be told involves the interaction between two characters, the two levels of analysis correspond to two different speech situations. One way to see if a story teller is differentiating the immediate speech situation from the speech situation in the story which he is telling is to look at the pronouns that he uses and see if they appropriately reference the different speakers. The narrative task and the acting-out task differ in the demands they make on the story teller with respect to clearly referencing the two speech situations for the listener. When narrating a speech situation not immediately present, third person pronouns are often used. The first and second person pronouns are not used unless the characters' utterances are framed with third person forms such as "She said 'I...'" or Ernie said 'You...'". "I" and "you" refer to the speaker and listener in the immediate speech situation and if they are to reference the characters in the story situation, they must be embedded in the appropriate frames. If one is

acting-out a story (as with puppets), the situation is different. Here, first and second person pronouns can be used without person frames. The presence of the puppets and their gestures to one another reinstate the story situation in the present, and therefore it is not necessary to reference who the speaker is with a third person frame.

How do 5 and 10 year olds respond to the task of telling about a social interaction to an uninformed adult? Both the 5 and 10 year olds found it difficult at times to verbalize who the speaker was and reference the speaker with the appropriate pronoun. Both younger and older children often began to use the third person pronoun, "he", in their narrative retellings without referencing the speaker when it changed in the narrated speech situation. For example, an older child began his story as follows:

1. "In the beginning, Bert had a cookie
2. Ernie is hungry
3. and he wanted to share it with him
4. and he wouldn't share it with him.
5. He said it was his
6. and he's been saving it all day
7. and then Ernie says: If it was my cookie..."

By utterance #5, a listener who did not know the story would become confused as there is little in the narrative account to indicate who is speaking at this point. In utterance #7, the child references the speaker, Ernie, by name so that the listener can probably infer that it was Bert speaking in utterance #5 and 6. The younger children named the speakers in their narrative accounts less frequently, requiring the listener to ask questions to clarify who the

"he" is.

Inconsistent pronoun choice sometimes indicated directly the difficulty that the children had in keeping the two speech situations clearly referenced. Consider the following excerpt of a younger child acting out the skit:

1. Oh, a cookie, Bert.
2. and I said 'hold it, ho hoo ho ho ho.
3. Ho Bert?
4. I've been saving this cookie all day for me.
5. He won't even share that cookie with your very best friend.

Within this passage, there are two pronouns used inconsistently: "I" in line 2 and "he" (or "you") in line 5. In line 1, Ernie is speaking; line 2 is Bert's reply. Here the child is trying to reference the change in speakers for the listener with the framing device "and I said." Instead of saying "and Bert said" or "and he said", the child creates himself as Bert speaking in the story situation when he uses "I". Since this is the acting out of the story, the child did not need to include any framing device. But in doing so, he gives evidence that the two speech situations (where he is (a) the speaker for Bert and Ernie and (b) the speaker reporting them to the listener) are confused at some level. In line 5, there is another interesting pronoun slip. Here the child combines two incompatible pronoun forms in one narrative utterance: "he" and "your". Regardless of which the child intended to use, these two incompatible forms show that he tried to talk about Bert and to Bert in the same utterance, suggesting that the two speech situations are closely entwined for him.[1]

This kind of confusion of pronouns within one utterance was found mostly in the younger children's stories; there were very few errors of this kind in the older children's stories. This suggests that the job of monitoring the two speech situations involved in story telling has become more manageable for the older children.

In addition to problems with pronoun choice, the younger children sometimes demonstrated an inappropriate narrative style in a more striking way. In their narrative accounts, some five year olds started to drop out third person narrative frames altogether and just retell the story in direct dialogue. The listener was forced to inquire who was speaking. After having done the acting-out task, a younger child began her narrative this way:

1. Child: 'Yum, yum, yum'
2. Adult: 'Yum, yum, yum' who says 'yum, yum, yum'?
3. Child: Bert.
4. Adult: Oh, Bert.
5. Child: 'Will you share that cookie with me?'
6. Adult: Who said that, Ernie? Ernie comes in?
7. Child: Yeah. 'No I will n... I will not share the cookie with you.' 'Wait a minute.' um, Bert.... Ernie grabbed the cookie from Bert, and then....

The child here is not monitoring her story telling so as to account for the needs of the listener since in this case the listener does not have the movements of the puppets as a way of establishing which character is speaking. As Table 4 showed, this type of error was mainly observed for the younger subjects when the narrative followed the acting-out task.

The interviewers were not passive listeners as is

illustrated by the above transcript and clearly indicated by the quantity of probing which occurred during the story tellings. It appears that the interviewer compensates for the child's difficulty by asking the questions that she/he has about the story being told. Some of the ways in which the interaction between the subject and interviewer changed with age has been described above. We now want to speculate as to the functions served by the adult interviewer's role in the interaction.

The interaction between the child and the interviewer is not entirely unrelated to the child's understanding of the other level of interaction--the interaction between Bert and Ernie. The task of presenting a coherent and informative account to an uninformed listener is undoubtably easier if the story teller has a clear idea of the events and their relation to one another. Having a representation of the plans of the characters makes digression or paraphrase possible without loosing the main story line. The storyteller with such a representation knows where to begin, what can be left out and when the story is finished. Many of the interviewer probes were simply asking what happened next: "Then what happened?" "What did Ernie do then?". These questions presuppose that there is a temporal sequence of events and that sequence is not yet over. Thus, the questions communicate the adult's expectations and focus the child's attention on the thing that the adult would consider to be a relevant next utterance i.e., a report of the next event or a report of one character's

reaction to the action of the other character which the child had just reported.

The probes also served a supportive function. Some "probes" simply gave encouragement that the task could be done or acknowledgement and praise for what was produced. The more directive probes were also supportive in that they provided a framework in which the story could be told. For children who may have lacked a clear representation which would give the sequence of events an internal structure, the questions appeared to provide an external structure for their retelling. For the older children, it appears that their understanding of the interaction between Bert and Ernie gave structure to their management of the interaction with the interviewer--they could play this role assigned to them with little hesitation. For the younger children the interaction with the interviewer gave structure to their retelling of the Bert and Ernie interaction.

The two levels of social interaction are intermeshed. Story telling is an interactive occasion with special demands of keeping track of what the listener knows and what references the listener would understand. Where the listener is active, some of this burden may be shifted from the story teller and the interactive process by means of which this shift takes place can itself become a topic of research. Knowing how the child understands the data collection situation appears to be critical to interpreting the data collected.