

Summary

Our preliminary investigation has yielded several analytic techniques which have proven useful in measuring age differences and the effects of task variables. The procedures for coding the retelling protocols break the protocol down into those aspects that could be called the "product" and those which relate to the process of production. Both aspects showed age differences and often differences for task. Among the product measures, "style" revealed particularly interesting results with not only a task difference but an age X order interaction suggesting differences in how the different ages interpreted the task instructions. Our efforts to link each proposition with an event or events in the observed skit resulted in a reliable coding procedure if not in spectacular findings. The rules we developed begin to differentiate reports of specific events from broader formulations. This distinction would be critical for any attempt to assess what parts of a story were recalled by a subject. The procedures for analyzing the comprehension interview showed clear age differences on a dimension that appears critical in the comprehension of social interaction.

Conclusion: The development of story telling skills in social interaction.

The example of the previous section have illustrated that story telling can be an extremely complex task. Not only must the events in the story be represented

in memory but they must be retold in relation to the listener's knowledge and sense of relevance. We have noted that one of the striking differences between the five and ten year olds was in the adult interviewer's role in the story telling process.

When we set out to collect these data, we planned to elicit stories from the children that would be the product of their own ability to tell what they knew about the story, its plot structure and the characters. With the older subjects, we could ask them to narrate or act-out the story and they could accomplish the tasks with relative ease and little need for adult probing or intervention. With the younger subjects, however, not even the more sophisticated story tellers could reproduce the story without adult help. The narrative and puppet show stories were very clearly the product of an interview situation for the younger children. They would stop and either ask for help or simply not continue until the adult reminded them of what they were just saying, and ask "what happened next?", "What did Ernie say then?" The adult was forced to be an active, sensitive participant and not a passive listener in the story telling process.

As we analyzed the data, we were bothered that there was so much adult intervention in these five year old's stories. We wanted to separate out the adult's role in the story telling process for the five year olds so we could compare their stories to the ten year olds which had far less adult intervention. We counted adult probes, the

child's hesitations and false starts as measures of production difficulty, but we did not know how to use these measures in a specific way to explain the stories that the children told. Now we have come to see the importance of these production deficiencies for what they suggest about the development of story telling skills.

It is our hypothesis now that a child's ability to retell stories emerges from specific types of social interaction involving the retelling of a story with an adult. It is our contention that young children learn how to verbally recapitulate a set of events as a result of first carrying out this task with an adult who can provide guidance and support. Children do not magically learn to narrate a story as a product of maturation, age, or general schooling. We suggest that the adult's questions and probes, as demonstrated in the five year olds' retellings, are the necessary first step in getting the child to understand the task of narrating a story. In particular, the questions the adult asks provide the child with the kinds of questions he must ask himself if he is to do this task on his own. What an adult listener does for the child is to overtly verbalize the questions that a speaker must put to himself, almost without thinking, when he reconstructs a story's events. We would suggest that the older children in our sample have internalized the skills necessary to carry through most aspects of narration through repeated experiences of recapitulating events or ideas with adults both in and out of school.

These hypotheses have been formulated in light of L. S. Vygotsky's theory of development (1978). He proposes that the development of higher mental processes begins at the interpsychological or social level and then proceeds inward to the intrapsychological plane of functioning. Vygotsky maintains that a child learns to regulate his own behavior by first carrying out a set of actions under an adult's guidance. In relation to developing narrative skills, the child begins to understand the demands of the task as he interacts with an adult to jointly carry out the task. In this way, the child's actions are first regulated by social means and then regulated more and more by his own internal means. One of the authors (see Dowley and Sulzby, 1978) is now studying this process of internalizing narrative skills. This research is aimed at describing the "other-regulation" that must precede "self-regulation" in telling a story to someone, and at describing the transitional process from external to internal means.

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Footnote

¹Research on the use of pronouns to reference speech situations in story telling and on children's learning to use correct pronoun forms is currently being carried out by Maya Hickmann at the University of Chicago.

Appendix 1: Procedures for coding the retelling protocols

The coding system utilizes prepared sheets illustrated in tables 5&6. The process of coding consists of two phases. The first phase involves recording on the coding sheet what the subject said (the connectives and the propositions), the fluency with which he said it and the utterances of the interviewer which questioned, instructed or encouraged the subject. All of this is recorded on the sheet in the columns labeled "Production". The second phase involves classifying each of the subject's propositions in terms of two sets of categories. First, each proposition is assigned a number or letter which refers to the part of the skit that the proposition is supposed to represent. Second, the number or letter is placed in one of the columns under "Event Representation" which represent the form in which the event or set of events in the skit is represented (e.g. as an action, as dialogue). Thus both the content and form of the proposition is classified and recorded on the coding sheet.

Phase One: PRODUCTION

The first phase is a process of distillation of the verbal exchanges between the interviewer and the subject, and of the hesitations and false starts in the subject's utterances, in order to arrive at a concise record of what the subject finally said in recounting the skit, i.e., a set of propositions and the connectives that link them. At the same time, the occurrence of interviewer utterances and of hesitations and false starts by the subject are

recorded in coded form in order to provide a measure of the ease or fluency of the subject's production. Table 5 illustrates the application of the following coding procedures to the "raw" transcript of a 7-year-old's story.

1. Interviewer Probes.

The first things to be recorded are questions or comments (if any) by the interviewer which precede the subject's utterances. We have identified six types of probes which interviewers use. Each type can be designated by a number. For each sentence by the interviewer, a number indicating the type of probe is placed in the probe column. A sequence of several probes may occur before the subject finally says something. In this case, a series of numbers is placed in the probe column to the left of the proposition which the subject finally produces. Note that coding of the protocol begins when the subject starts telling the story, so that the initial instructions are not coded, except when the first story-relevant proposition by the subject is directly in answer to a question.

We first list the kinds of probes with their number designations. Second, we discuss special problems involved with identifying and designating question type probes. Third, we discuss procedures for preserving information from the question probes that is implied in the subject's answer. Probe types 5 and 6 do not present special problems. Some special uses for type 4 are discussed with reference to the question types.

Table 5: Example of Phase One Coding.

FULL TRANSCRIPT

(Interviewer's utterances are in brackets, seconds in parentheses)

[Tell me what they did in the story, okay?] Okay uh (3) "Hey Ernie, I mean Bert, will you share that cookie with me." (2) and uh [Oh Bert has a cookie.] Yeah. [I see] And he hides it. [Oh he hides the cookie. Who's he hiding it from?] uh Ernie, Bert, Ernie. [Ernie] and (3) and then he um asks um if he will half it with him, I mean like, [Half it with him, share it with him.] Um yeah. [Yeah.] Like he would, "Wait let me explain." And then he gives the cookie to him. He takes it away uh Ernie takes the cookie away from him and he says "Pretend um I had a cookie and I would share it with you." Then um and then "What would I say". And then he said "Ask me if I could have half a cookie." And then he said um (2) "Ernie can I have half of the cookie." And he had a half, he broke it in half and had a half and then Ernie went away eating it [I see] and then and then his nose was like that [His nose was like that] and then and he came along and said "Could I have half of half of that half of cookie of the cookie." [Uh huh] And then he said "Rrrrah." [Bert got] He screamed. [Bert screamed] Uh huh. [Bert was pretty mad.] Yeah. [Ernie must have been pretty hungry, huh?] Uh huh. [Kept wanting more cookie.] And that was all. [That was all?] Yeah. [That was a great story, thanks alot.]

PRODUCTION				
PROBES	HEFT- ACTIONS	FALSE STARTS	CONNECTIVES	PROPOSITIONS
	1			"Hey Bert will you share that cookie with me?"
1				[Bert has a cookie]
5			and	he hides it [from Ernie]
4	3		and then	he asks if he will half it with him [share it]
4		D		"Wait let me explain."
		D	and then	Ernie takes the cookie away from him.
			and	says "Pretend I had a cookie and I would share it with you"
			and then	"What would I say?"
			and then	he said "Ask me if I could have half a cookie.
		D	and	he broke it in half.
			and	had a half.
			and then	Ernie went away eating it.
5		S	and then	his nose was like that
4			and then	he came along
		D	and	said "Could I have half of that half of the cookie"
5			and then	he said "Rrrrah",
4				He screamed.
4, 1				[Bert was pretty mad.]
1				[Ernie must have been pretty hungry]
4			and	that was all

a) The following six types of probes can occur:

1. Choice questions (which elicit a yes or no response.)
2. Specific product questions (which elicit a particular piece of information, e.g., What did Ernie say then?)
3. General product questions (which elicit general information about what happened next e.g., What did they do then?)
4. Repetitions or reformulations of the subject's previous utterance or utterances (as well as some miscellaneous types explained below.)
5. Supportive statements such as exclamations, or praise and simple acknowledgements (e.g., uh huh)
6. Instructions.

b) Question types (1, 2, and 3). The coder's decision about what type of question was asked is based primarily on what the subject appeared to take the question to be asking for and secondarily on the grammatical form of the question. For example, "Did he say something?" is literally a choice question but if the subject answers: "He said . . ." the question is coded as 2 (i.e., as equivalent to "What did he say?") not as 1. Likewise, if the interviewer makes a statement (usually 4) but the subject confirms it by saying "Yes" the statement is coded as a choice question (1). Where the subject's response does not match the grammatical question type, the coder must decide whether the subject is responding to the question in a non-canonical way or whether the subject is simply

ignoring the question. In a case where a question is not responded to, i.e., where the subject continues his story but not by answering the question, the question is coded as 4 (this does not apply to questions which are followed not by a subject utterance but by another interviewer probe).

In a case where the interviewer asks a series of questions and the subject answers not the last question but some other question in the series, the numbers for the probes which follow the answered question are placed in parentheses (e.g., Int: What did he say? Was he happy? S: He said "Hello". Here the probes are coded 2 (1) to indicate which kind of question the subject actually answered.)

c) Answers to probe questions.

Answers to question types 1 and 2 are often elliptical. The subject does not repeat all the information in the question when he answers (e.g., Int: What did Ernie say? S: "Hello"). When transcribing the subjects utterance in the Proposition column, the missing information is included in brackets (e.g., [Ernie said] Hello). In the case of choice questions, the answer typically omits the entire proposition (e.g., Int: Did Ernie say "hello?" S: Yes). In this case the whole proposition is included in brackets (e.g., [Ernie said "hello"]) in the proposition column. (Note that for type 3, the question usually provides little information that is necessary for interpreting the answer. But when it does, the information should be placed in brackets along with the proposition.)

Some questions by the interviewer only confirm something the subject already said (e.g., S: Ernie said "Hello". Int: He said "Hello"? S: Yes. Int: I see.) In this case the whole question-answer-acknowledgement exchange is coded as 4 in the probe column and the next utterance appears in the proposition column. That is, the whole exchange is treated like a comment by the interviewer. Likewise where the interviewer attempts to resolve the ambiguity or unclarity (e.g., S: He said "Hello". Int: Did Ernie say that? S: Yes. Int: Oh.) and where the answer does not add new information but only clarifies what was already intended, the question-answer-acknowledgement sequence is coded as 4. When an ambiguity is resolved in this way the coder may indicate in brackets within the original proposition the clarifying information (e.g., place in the proposition column: He [Ernie] said "hello".) Whenever the answer to a clarification question adds substantially new information, the answer is treated as a new proposition and the question is coded for what it is (as 1 or 2).

2. Hesitations.

Hesitations before beginning an utterance or during the utterance provide an indication of the subject's difficulty in formulating the utterance. Whenever a lapse of greater than two seconds occurs either before the utterance or during its course, a numeral representing the number of seconds is placed in the hesitation column. Spaces between interviewer probes are not counted but

those between the probe and a subject utterance are. In calculating the duration of a hesitation, non-word sounds (e.g., uhhhh) and "metacomments" that fill up the space (e.g., uh, let me see) as well as silences are counted as hesitations providing they take up two seconds.

3. False Starts (and repetitions)

Like hesitations, false starts provide an indication of difficulty of production. Two kinds of false starts are coded for: those in which part of an utterance (often the beginning of it but also middle parts) is said twice (coded S for "same"); and those in which the subject starts out to say one thing, but stops short and says something different (coded D). Whenever a subject both repeats the same thing and changes something within the same utterance, the utterance is coded only D in the False Start column, i.e. D overrides S.

Any case of false start must contain at least two contiguous words. In the case of S, these two can be made up of the same word repeated twice (e.g., He he he said "hello") or two words repeated once (e.g., he said, he said "Hello"). In the case of D, the part that is reformulated also must contain at least two words (e.g., He went, he said "hello"). Note that the segment that is changed must contain two words but only one of the words need actually be different. Single words which are repeated or changed (even when two or more different words are repeated or changed e.g., Bert, Ernie went into the the other room) are not counted as false starts.

If the entire proposition is repeated exactly, it is only given once in the proposition column, but S is placed in the False

Start column. Note that if the same event is reported by the subject in two different complete utterances, they are not treated as a false start.

If a subject starts out to describe one event but does not complete it and goes on to describe another event, only the second description appears in the Proposition column but D is placed under False Start.

If the subject, in answering a probe question, changes his answer, only the final response is put in the Proposition column but D is placed in the false start column. If the subject changes the answer after the interviewer acknowledges the answer (which would normally be coded 5), the acknowledgement is not noted in the probe column but D is placed in the false start column.

4. Connectives.

All temporal or causal connectives and conjunctions (then, and then, so, because, and, etc.) which link story propositions are placed in the Connective column next to the propositions which follow them. Connectives which occur within a piece of quoted dialogue remain in the proposition column. False starts often occur after the connective is already given but the reformulation does not contain the connective (e.g., And then Ernie goes, Ernie says . . .). In these cases the connective is assumed to apply also to the new proposition and is included in the Connective column.

5. Propositions.

Only the final "cleaned up" version of the proposition (excluding false starts, repetitions, hesitations) is placed in the proposition column.

The subject's recounting of a skit is broken down into separate propositions on the basis of two criteria. Most importantly, the Master List of Events (Appendix 2) is used as a guide to what counts as a separate proposition. A new line on the coding sheet is given for any utterance (or part of an utterance) of the subject which describes a separate (numbered) event on the list. (In general, when a subject is quoting a character's turn at talk, the entire turn is considered a single proposition unless the turn is broken up on the master list.) Secondly, connectives are used as an indication that the subject is beginning a new proposition (except when the connective occurs as part of a piece of quoted dialogue.) It is important to note that "because", and other indications that a "reason" is about to be given, are important connectives which define new propositions.

While in some cases the answer to a probe question may appear to take up more than one proposition, each proposition is given a separate line so that the probe will be considered as applying only to the first proposition following it.

When the subject asks a question of the experimenter or when a non-story-telling conversation takes place these can be briefly described in brackets under the Proposition column and need not be fully transcribed.

In the data collection so far, the movements and other physical actions of the puppets in the acting out task were recorded by means of a check-sheet. Since timing of these movements in relation to the subjects' audiotaped utterances was not recorded, the movements

indicated on the check sheet are transferred to the first lines of the coding sheet before the audio transcription begins. (Ideally, the acting-out task could be recorded on videotape, in which case procedures for transcribing the subject's movements simultaneously with his verbal utterances will have to be developed).

Phase Two: EVENT REPRESENTATION

This phase of the coding system is designed to describe what information from the skit a subject reproduces in the narrative and acting-out task, and to describe how this information gets represented; whether as a piece of dialogue, through narrative recounting, or through actions. We first define two levels of information presented to the viewer of the Bert and Ernie skit. We then define the various forms in which a subject can reproduce any of this information. Finally we describe the procedures for indicating on the coding sheet what information was produced and in what form.

1. Kinds of information available to subjects.

In order to score what the subjects are producing and reconstructing in the narrative and acting-out task, we had to make some decision about what the content of the skit is that they are responding to. We identified two levels at which the input could be described. Appendix 3 is a "master list" of the "events" in the skit "Ernie Shares Bert's Cookie" that we code for. Individual events (identified by numbers) are grouped into episodes.

a) Events. We decided to take the actual utterances of the two characters and their gross motor movements as one way of

describing the content of this skit. The list includes 10 pieces of information: 66 verbal utterances of the characters and 30 actions and 5 other items having to do with the setting or framing of the skit. The actions include behaviors such as smacking lips, scratching one's head, characters entering and exiting, turning around, but the list does not include the more subtle gestures of the characters as they stand talking with one another.

b) Episodes. The skit as a whole has been subdivided into 13 episodes. We used Mandler and Johnson's (1977) analysis of story structure to derive the episodic structure of this Bert and Ernie skit. This was done in order to get some idea of how the 101 events hang together - what their relationship is to the overall development of the story.

2. Forms for representing information from the skit.

Each verbal proposition and action of the subject can be classified as one of the following:

a) Action. The subject's physical movements of the two puppets in the acting out task are classified as actions. Also, all sound effects in either task are coded as actions (for example, crunching sounds to imitate the eating of the cookie.) Note that if a sound effect is framed within a narrative sentence (e.g., "Ernie went crunch") the proposition is considered as narrative.

b) Dialogue. A subject's proposition which represents the actual conversation of the two characters is classified as dialogue.

That is, a proposition is dialogue when the subject speaks Bert or Ernie's lines. Included here (and in Framed Dialogue) are any kind of vocalization (distinguished from other sounds which are considered as actions.)

c) Framed Dialogue. The proposition is classified as framed when the subject relates the words of a character along with signalling who the speaker is, for example, "Bert said 'Hello'". Note that when the frame appears in brackets because it is derived from an interview probe, the proposition is classed as Dialogue.

d) Narrative. Propositions are classified as narrative when they describe an event or set of events from the skit.

e) Inference. The term inference is used very broadly to refer to any proposition by the subject that does not refer to an event or events in the skit but is based on events in the skit. Rather than reporting an event or set of events which occurred in the skit, the subject, in making an inference, uses information to make a statement that is not explicitly part of the skit. Three kinds of propositions are considered inferences:

- i. Propositions which describe the internal state of a character. Internal states include a character's desires, thoughts, feelings or intentions (e.g., "Ernie wanted the cookie"; "Bert thought Ernie was just demonstrating"). Note that many verbs which describe actions or attempts imply that the character had particular beliefs, intentions, expectations, etc. For example, "Ernie tried to grab the cookie" implies that he wanted the cookie and

expected his action to accomplish the goal of getting the cookie. These propositions are considered narrative since the internal state is not made explicit.

ii. Propositions which give a reason for, state the purpose of or otherwise explain some event(s), (e.g., "Ernie broke the cookie (narrative) so Bert could have some" (inference))

iii. Propositions which describe events which did not actually occur during the skit but which are implied or suggested by what the characters say or do during the skit. For example, during the skit a character may describe an event which happened before the skit began. If the subject gives a narrative report of this event rather than just giving a dialogue account of what the character said, then the proposition is considered an inference.

3. How Phase Two Coding is Done.

a) General considerations. Table 6 illustrates phase 2 coding. Essentially the problem is to place numbers, letters (from the Master list) or some other symbols (explained below) across from the story proposition being coded and in a column indicating the form of the proposition. This procedure involves the determination of what events are being referred to by the proposition and in what form. In the case of the inference form, it involves the determination of what events are the basis for the inferences.

Table 6: Example of Phase Two Coding.

CONNECTIVES	PROPOSITIONS	EVENT REPRESENTATION				
		ACTION	DIALOG	FRAMED DIALOG	NAR- RATIVE	INFER- ENCE
	"Hey Bert will you share that cookie with me?"		B			
	[Bert has a cookie]				3	
and	he hides it [from Ernie]				8,12	
and then	he asks if he will half it with him [share it.]				D	
	"Wait let me explain."		64			
and then	Ernie takes the cookie away from him.				63	
and	says "Pretend I had a cookie and I would share it with you"			68		
				57,60		
and then	"What would I say?"		73			
and then	he said "Ask me if I could have half a cookie.			74		
and	he broke it in half.				82	
and	had a half.				K	
and then	Ernie went away eating it.				92	
					88	
and then	his nose was like that				94	
and then	he came along				97	
and	said "Could I have half of that half of the cookie"			98		
and then	he said "Rrrrah".			100		
	He screamed.				100	
	[Bert was pretty mad.]					100
	[Ernie must have been pretty hungry]					98
and	that was all				101	

Assigning proposition to form types is almost never a problem. The difficulties to which the following procedures are addressed have to do with choosing appropriate symbols for filling the boxes. The coder must decide what information from the skit the subject was intending to represent or, in the case of an inference, what information forms the basis for the inference. When a subject repeats a piece of dialogue verbatim there is no problem in deciding what is being represented. But the length and complexity of the skit often result in what appear to be summaries, elliptical descriptions, or reformulations of a sequence of events as a single event. What is produced by the subject, however, is usually recognizable as a "version of the story" and on an intuitive basis, the coder can sense how the subject got to that version. It should be noted that our primary interest is not with the amount of recall--subjects were not instructed to recall every detail they could but rather, more loosely, to "tell the story." Thus summaries, short cuts, reformulations and inferences may have been made more prevalent. In any case we take these phenomena to be important and interesting solutions to the task demand of representing the skit in a narration or acting out. Therefore, the coding system is designed to take into account the various ways in which a subject can reference or make use of an event or set of events in constructing his "version of the story."

As explained below, in many cases a single numbered event can be assigned as the referent or basis for the proposition. Episode letters are used in cases where the pro-

position refers to or is based on some larger set of events, or where it is sufficiently vague that it cannot be attributed to a particular event. The symbol "S" (for story) can be used when the proposition refers to or is based on the story as a whole rather than to a subset of the events. The symbol "X" is used for propositions that refer to or are based on events external to the skit. The symbol "?" is used for propositions, the reference or basis for which cannot be determined.

Subsections b to f below are concerned with propositions of a form other than inferences and g is concerned with inferences. Sections b to f provide a decision procedure in the sense of an ordered sequence in which the various options available to the coder should be considered. First (in b) the proposition is examined to see whether, considered alone, it can be seen as the gist of a particular event. If it cannot, the coder then (c) considers whether the order of the proposition in the subject's story (in relation to other clear propositions) can be used to disambiguate it. If the proposition cannot be assigned to a particular event, then the use of episode letters is considered (d). As with single event interpretations, recognizability and order are used also for assigning episode letters. If the source of the proposition is not found in the skit, then "X" is used to mark the proposition as an intrusion (e). Finally (f) if the proposition is so vague, incomplete, etc. that it cannot even be seen definitely as an intrusion, then it is assigned "?" for uninterpretable.

b) Reference to a Single Recognizable Event. Most propositions are of this sort and present little problem for coding.

i. Gist. Considerable latitude is allowed in interpreting a proposition as referring to an event. The proposition must merely capture the gist of the event by which is meant that the proposition in the story must roughly have the same function as the event in the skit. Often this means that certain key words appear in the proposition but the idea may be represented in any way. Unusual individual interpretations (and even misinterpretations) of the event can be counted as a reference to the event providing it is otherwise clear that the subject intended to refer to the particular event.

ii . Occasionally, a single proposition which cannot be broken down refers to two (or more) contiguous events. This occurs especially where the subject gives the gist of a character's conversational turn in a case where the turn is broken, on the Master List, into separate events. In this case the numbers are joined by a hyphen (e.g., 59-60).

c) Use of Order to Resolve Ambiguity. If the referent cannot be determined from the proposition alone, the order of reported propositions and their relation to the order of the events in the skit is used to decide the probable referent of the proposition. While many propositions, taken alone, are ambiguous in that they could refer to more than one event, their position in relation to unambiguous propositions is used, whenever possible, to

determine the reference. The assignment of referents to vague propositions is constrained by the clear propositions that may precede or follow them. For example, on five occasions (19, 27, 45, 52, and 62) Bert "tries to eat the cookie" but only one of these is preceded by Bert saying "I've been saving this cookie all day for me" (51). So if the subject (unambiguously) reports 51 and then an eating attempt, Bert's action would be coded as 52. This procedure assumes that the subject is telling the story in the correct order but describing the events vaguely, i.e., he is given the benefit of the doubt. (Clearly this assumption will limit what can be said about the subject's ability to recall in correct sequence--this ability may be overestimated.)

There are many events in the skit which are quite similar (e.g., Bert's eating attempts and some of Ernie's utterances that he repeats). In these cases, when the propositions cannot be disambiguated by means of their order, the numbers for all the events it could be referring to are entered on the coding sheet separated by commas. (In any calculation of the amount of recall, the subject would be credited with referring to only one event but the double or triple coding preserves both the extent of ambiguity and the number of events within particular episodes that are reported or possibly reported.) Note that when propositions are so vague that they could be referring to two or more events which are not repetitions, then the various possible event numbers are not given, but the following procedures involving episode letters (or other symbols) are followed.

d) The Use of Episode Letters. Once the possibility of a single event (or clearly defined set of similar events) interpretation has been eliminated, then episode letters are used to indicate the approximate location of the event or the range of events which may be formulated or summarized by the proposition. Episode letters are used in three related ways:

i. Sometimes the proposition either appears to refer to several events within an episode or it is so vague that it is not clear whether the subject meant to refer to one event or to several events in the same episode, i.e., the proposition is not clearly the gist of just one of the events but nevertheless "fits" in the episode. In this case the letter for the episode is used rather than arbitrarily assigning the proposition to a particular event. For example, in Table 3, "had a half" is coded K since it could be referring to Ernie's eating the cookie (event 88) or to his holding the cookie or both. (Note that, as explained in b iii, when a proposition formulates the gist of a character's conversational turn which spans two events, the event numbers are used.)

ii. Closely related to the above is the use of episode letters for propositions which appear to formulate a new event which seems to fit with the gist of the episode. Because the new event has the same upshot as the actual events, it is not coded as an intrusion. For example, the subject may have Ernie say "that's not fair" just before he says "I would share it with you". The first

utterance is not something that happens in the skit but it is the kind of thing Ernie might have said during episode G so it is coded "G". Note that the use of these letters is not meant to imply that the new event necessarily reformulates the entire episode but rather that it reformulates some part of the episode.

iii. Reformulations may have a wider range than a single episode. Identifying the referential range of such propositions is problematic but can be guided by two considerations. First the position of the clear propositions relative to the formulation in question can be used to constrain the likely range of the formulation. Second, key words in the formulation signal which episodes are being referred to. (The key words found in the short episode descriptions provided in Fig. 1 can act as a guide to what part of the skit the proposition formulates.) These considerations must be weighed against each other in any particular case. It is not possible to state a strict rule for determining the range of the reference for these propositions which tend to be vague and underspecified. In coding these propositions, the coder must use his intuition about what the subject could reasonably be said to be referring to. Note that providing episode designations for some segment of the skit (e.g., B-F) does not imply that the subject recalled everything within that segment but only that his proposition provided the gist of some of the important events in the segment. Note also that segments are always designated by a continuous series of letters. Thus a formulation may have to do with events in B C D and F but not those in E yet, for simplicity, the proposition is still coded as B-F not as B-D, F. Note also that the symbol "S" is available for formulations which are so general as to include the entire skit.

e) Intrusions. If a proposition does not seem to derive from (or fit in with) the skit at all, it is coded X. This symbol is used when it appears that the proposition has some external source (e.g., the subjects imagination, his memory of other skits, etc.)

f) Uninterpretable. Two kinds of propositions are marked "?" as uninterpretable:

i. Those which are inaudible or so incomplete as to be uninterpretable. (Note that many of these will already have been eliminated as false starts from the list of propositions.)

ii. Those propositions that are so vaguely stated that they cannot be assigned a number or letter and it is not clear whether or not they are intrusions. Note that reference to characters are often unclear either because the names have been switched or because the pronoun antecedents are not clear. In these cases the coder chooses the most likely interpretation given the position and content of the proposition. For example, if the subject says "Bert broke the cookie" but has already reported that Ernie took the cookie then the coder can assume that the subject meant that Ernie broke the cookie and code it as event 82. The proposition is coded "?" if the reference is still too vague to be interpreted.

g) Inferences. Similar problems to those discussed above with regard to determining reference arise in the case of inferences except that in this case the problem is to determine not the reference but the basis for the inference. This class of story propositions often are not based on information that follows in sequence from the referents of the other story propositions. Thus order cannot be used in determining the basis for an inference.

i Sometimes a single event is the entire basis for the inference. In this case, the number for the event is placed in the inference column. Often, however, the inference is based on some series of events. When the basis for the inference can be clearly identified, not as a single event, but as some set of events within an episode or within some definite group of episodes, letters are used to designate the basis. Note that in coding for some range of episodes the entire sequence is given (e.g., A-F) even though some of the intermediate episodes may not contain any new information.

ii. We recognize that the subject's story is a retrospective account and that a particular inference may represent a hypothesis built up and confirmed over the entire course of viewing the skit. The symbol "S" is available for coding such cases. For example, if the subject says "Bert had a cookie and Ernie wanted it", Ernie's desire for the cookie is displayed in his barrage of strategies throughout the skit. Likewise, if a subject explains Bert's confusion at the end by saying "because it was his cookie", the inference is coded "S", since throughout the skit Bert and Ernie act consistently on the assumption that it is Bert's cookie.

iii. "X" can be used to code inferences that have a basis outside the skit (e.g., explanations based on what Ernie typically does based on other skits seen on Sesame Street.) If the inference has neither a clear external or internal (to the skit) basis, the proposition is coded "?".

APPENDIX 2: Coding the Comprehension Interview.

In this appendix we describe in more detail the criteria and rules of interpretation used in assigning "levels" to the children's responses. These criteria can be stated in relation to the verbs which the children use in their explanations and to the context of the explanation.

Role of verbs. Verbs with implications corresponding to each of Levels 1, 2, and 3 in the coding system can be distinguished. It will be convenient to review these briefly, and then to discuss the general rules of evidence used to infer whether the child's understanding of the interaction actually corresponds to the "typical meaning" of the verb in question.

Level 1 verbs: All internal state verbs, such as "thinking", "feeling", "wanting", generally imply a Level 1 description. The use of modal verbs--e.g. "going to _____", "let do _____", "will do _____" can be taken as a signal of Level 1 descriptions of intentions. For example, "Bert wouldn't let Ernie see the cookie".

Level 2 verbs: A number of verbs suggest that the agent is or has deliberately attempted to alter the state of mind of the recipient, thus indicating an implicit Level 2 conception of the interaction--e.g., "demonstrated", "persuaded", "convinced". For example, "Ernie persuaded Bert to let him have the cookie" implies an intention on Ernie's part to affect Bert's internal state (Level 2).

Level 3 verbs: Finally, a number of verbs also seem to imply a consideration on the agent's part of the recipient's reactions to his state of mind. The clearest examples of this Level 3 description encountered in the present context are verbs describing Ernie's impression management and deception skills--e.g., "tricked", "conned". For example,

"Ernie was tricking Bert into thinking he just wanted to demonstrate sharing the cookie". Here the verb "trick" appears to signal an understanding of Ernie's concern with Bert's reaction to his perceived sincerity.

Thus, the presence of different verbs in the child's account of the interaction could be taken as signals of different levels of comprehension. However, it seemed to us that the simple use of a verb without any further evidence of an understanding of its typical meaning for an adult would serve, in many instances, to overestimate children's comprehension. For one thing, words like "demonstrate" and "prove" were actually used in the dialogue so the children's use of them may have been simply a report of what the characters said they were doing without any real comprehension of what the character meant. Consequently, we required additional indicators of the child's comprehension of the meaning of Level 2 and Level 3 verbs, as described below, before accepting their usage as evidence of the corresponding level of understanding of the interaction.

In general, what we required as evidence of comprehension was some sort of paraphrase or explication of the meaning of the verb in question (for Levels 2 and 3). Frequently, children used verbs implying a level of comprehension, but provided no further explication of the word's meaning to them. For example, one child said "Ernie's trying to trick Bert, sort of...." as a response to the question of why Ernie asked Bert to ask him to share the cookie. Although

this is a Level 3 type verb, the child provided no further information about its meaning to him, and consequently, we decided to conservatively score the child's level of comprehension here at Level 2. Another child said "Ernie wasn't really demonstrating sharing....He was planning a scheme to get Bert." Here the phrase 'planning a scheme' might be considered as evidence for Level 3 deception, but the child gave no further explication of the meaning of the verb phrase here, and so again we scored this as Level 2 comprehension only. In contrast, another subject said, "Ernie had a plan that he is going to give one half of the cookie to himself... (He was trying to get Bert to think) that Ernie is a good friend and that he'd give the cookie to Bert." Here the child's explication of the meaning of Ernie's 'planning' in terms of altering Bert's perspective on him is clear, and this child was given credit for a Level 3 response.

It is difficult to completely formalize the types of evidence used for this disambiguation of the meaning of verbs. However, in general we looked for additional references to the internal state of the character which implied that the child comprehended the role of that state in the interaction in question. For example, the Level 2 verbs that indicate deliberate alteration of the listener's perspective could be substantiated by the description, in the subsequent explication, of the listener's state of mind:

e.g., (Why does Ernie say 'We have a problem?')
 "He's trying to talk him into giving him half the cookie.

He's getting him mixed up." (indicator of Level 2 as a direct reference to Bert's internal state of mind).

In contrast, another subject used the Level 2 verb demonstrate, but gave no indication of any consideration of the recipient's state by the agent in her subsequent explication and thus received a conservative Level 1 score for comprehension:

"He's just demonstrating sharing....(Why's he doing it?) Just to check so Bert, just check so Ernie could have half..." (no reference to consideration of Bert's state of mind here = Level 1)

Similarly, Level 3 verbs or verb phrases could be explicated by statements regarding the agent's intended demonstration of his own inner state of mind or perspective (to the listener), implying comprehension at Level 3. Or, they could be followed simply by a description of the actual behavior of the agent in his presentation to the recipient, suggesting a non-reflexive understanding focused simply on altering the perspective of the recipient on certain information (rather than the recipient's impressions of the agent's inner features).

e.g., "Ernie is trying to show Bert that he would share the cookie....But I don't think that he would."

(a description of Ernie's internal state as agent, and his impression management tactics here--scored as Level 3).

"Ernie wants to show Bert how he would share. So he says 'Give it to me' and ...then he cracks it and he

gives him half and he eats half..." (explication focuses on a demonstration of "sharing behavior", rather than Ernie's inner state of sincerity--scored conservatively at Level 2).

Response context rules. The preceding discussion is intended to cover the child's descriptive account of the interaction in response to the interviewer's probes. Two special contexts of response need more detailed discussion here, however.

i. Choice questions: In many instances, the interviewer may ask a question which includes a complex level statement (So Ernie was demonstrating to Bert?), but which the child may simply answer with either yes or no. An appropriate "yes" or "no" response here is not to be taken as sufficient evidence for the inference that the child understands the interaction at the level in question. Additional elaboration or paraphrase of the proposition in question is necessary. Similarly, the repetition of terms used by the interviewer, or in the skit itself (e.g., "demonstrate") without additional evidence is not sufficient for scoring the child at the higher level in question.

ii. Explanatory context: Since action is perceived and described as rule-bound and "motivated", the explanations given by the child for a character's actions are to be taken as implicitly describing the plans or intentions of the character in question. For example, the explanation of a character's action as due to the state of another carries

the implication that the agent is "considering" the state of the other character in acting as he does.

e.g., (Why did Ernie say 'Thanks a lot, Bert?')

"So Bert wouldn't blow up." (Level 2 description of Ernie's consideration of Bert's state of mind is inferred here).

APPENDIX 3:

MASTER LIST OF EVENTS FOR THE COOKIE SKIT

- 1 A skit from Sesame Street.
- 2 Bert and Ernie are named.
- A 3 [B is holding a cookie and looking at it.
- 4 [B: Um um um uh.
- 5 [E comes in.
- 6 [E: Bert, oh Bert.
- 7 E: What'd ya have there Bert?
- 8 [B turns away, holding cookie out of E's sight.
- 9 [B: Uh, oh nothing, Ernie.
- B 10 [E goes around behind B.
- 11 [E: Why Bert, that looks like a cookie Bert.
- 12 [B turns back the other way holding cookie out of E's reach.
- 13 [B: Huh- no Ernie.
- 14 [E reaches toward the cookie.
- 15 [E: Bert, that's a cookie and boy am I hungry.
- 16 B: Ernie Ernie ho ho ho ho ho:::ld it.
- 17 E: Ho, Bert why?
- C 18 B: Not so fast this cookie is for me. Um.
- 19 [B brings cookie close to his open mouth.
- 20 [E holds B's cookie-arm (with his left hand).
- 21 [E: Bert, but just a second Bert.
- D 22 B: What?
- part 1 23 [E puts his (right) arm around B, placing his hand on B's shoulder.
- * 24 [E: I think, Bert, that we have a problem.
- 25 B: No no, I don't.
- E 26 E: Yes yes yes we do Bert.

E

27 [B leans over with open mouth toward the cookie.

28 [E: You see, uh just a second Bert.

29 [E pulls B's cookie-arm away from his mouth.

30 [E: No, no don't.

31 B: It's my cookie.

32 [E lets go of B's arm.

33 [E: No you see Bert, you want to eat the cookie,

34 B: Yeah.

35 E: and I want to eat the cookie.

36 [E scratches his head (with his left hand.)

37 [E: So what should we do about it, Bert?

38 B: Well uh-

D
part 2

39 E: I, I have the answer.

40 B: You do.

41 E: Yes. We will share the cookie Bert.

42 B: I have a answer.

43 E: Um?

44 B: No we won't.

45 B raises the cookie to his mouth.

46 [E holds B's cookie-arm.

47 [E: Oh yes we- Bert, Bert just a second Bert.

48 B: What?

F
part 1

49 [E takes hand off B's shoulder.

50 [E: You wouldn't share that cookie with your very best friend Bert?

51 B: Ernie, I've been saving this cookie all day for me.

52 [B leans over towards the cookie.

53 [E pulls B's cookie arm away from B's mouth.

54 [E: Oh but Bert, no no no just just just a moment just a minute, Bert.

G

G

55 [E takes his hand off B's cookie-arm.

56 E: Now listen Bert, if this were my cookie, if this were my cookie,

57 E: I would share it with you, Bert.

58 B: No you wouldn't.

59 E: If that cookie belonged to me,

60 E: I would share it with you.

61 B: No you wouldn't.

62 B opens his mouth and raises the cookie.

63 [E takes the cookie out of B's hand.

64 E: Bert just a minute, I'll prove it to you.

65 B: What, ah ah ah.

66 E: Just just just a second Bert.

H

67 [B smacks his lips and wipes his mouth.

68 E: Now listen. Just pretend like this cookie is mine, see.

69 E: Now you ask if I will share the cookie with you.

70 B: You took that cookie from me.

71 E: I I just want to demonstrate.

72 B: Haaah. All right, all right, all right.

I

73 B: Uh, what do I do?

* 74 E: Just ask me if I'll share it with you, Bert.

75 B: Uh, all right.

76 B: This is silly.

77 B: Ernie, Ernie.

J

78 E: Yes Bert.

79 B: Would you share that cookie with me?

80 E: Why yes Bert.

81 E: I'd be happy to share it with you.

K

82 E breaks the cookie.

	83	E: Here ya go.
	84	E: One half for me
K	85	[E gives half the cookie to B.
	86	[E: and one half for you, Bert.
	87	E: See there? I told you I would share it with you, Bert.
	88	E takes a bite of his half of the cookie.
F	89	E: That's what friends are for, Bert.
part 2	90	E goes behind B to his other side.
*	91	E: Thanks a lot Bert.
	92	[E leaves.
L	93	[Music begins.
	94	[B looks at the cookie (but doesn't eat it.)
	95	[B: I don- I don't get it. I I don- I don't get it.
	96	Music ends.
	97	E comes back in.
	98	E: Hey Bert, will you share that half-a-cookie with me?
M	99	[B holds the cookie away from E.
	100	[B: A::::::::::G::H.
	101	That's the end.

Brackets to the right of the event numbers indicate that the enclosed events occurred simultaneously.