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The psycholinguistic communication strategies of a mother of a hearing-impaired infant

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The Psycholinguistic Communication Strategies of a Mother of a Hearing-Impaired Infant

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Introduction

Important to any of the theories of how man acquires language is the area of language production, especially in its earliest stages. While some linguists have documented the language acquisition process in their own children from their first days of life (Bellugi and Brown, 1964), most studies have analyzed the syntactic or phonologic aspects of children's speech from the appearance of two-word utterances (Albright and Albright, 1956; Brown and Fraser, 1963) to the speech of children in the early school years (Menyuk, 1964). Since Noam Chomsky's declaration that man's ability to learn language is innate, the role of the linguistic environment has been studied in order to determine its importance in the language acquisition and development process. While many students of language development stress the crucial role of the environment (Brown, 1958; Sachs, 1977), few studies approach the question of the composition of the child's language environment. Lenneberg et.al. (1965) compared the verbal environments of infants born to deaf parents with the environments of infants born to hearing parents, but was primarily interested in the child's vocal response to the environment for the first three months of life. Phillips (1970) compared speech addressed to children of different ages (8, 18, and 28 months) as well as to an adult, and found significant differences between them in measures of syntax and vocabulary as a function of age of addressee. The speech addressed to a child becomes more adult-like as the child increases in linguistic competence, but the base-line of communication toward young children is what is referred to as 'Baby Talk'. Numerous studies of

this universal phenomenon, also known as 'motherese', shows it to be characteristically simple, redundant, higher-pitched, and containing many more questions and imperatives, and fewer past tenses and disfluencies than regular speech. (e.g., Snow, Brown)

Snow (1972) confirmed the influence of age on degree of simplicity in her study of mother's speech to two-year old and ten-year old children. Studies by Newport et.al. (1977) of mother's speech to children 12 to 27 months old support the 'fine-tuning' hypothesis of language acquisition; that is, that the language input is closely tailored to the child's linguistic requirements, especially at the syntactic level.

While acknowledging the existence of 'Baby Talk', Snow (1977) suggested from her observations of two mother-infant dyads that the normal changes in maternal speech occur as a result of the social, and not necessarily linguistic, maturity of the child. Snow proposed that mothers communicate with their children in a conversational mode, which implies an exchange in both directions (or 'turn-taking') between the partners. While mothers attempt to elicit a response (verbal or motor) from their young infants through the use of questions and repetitions, they also acknowledge the child's inability to take or pass a turn, by speaking for the child. As the child matures socially, linguistically, and physically, he becomes a more sophisticated conversational partner, and the mother's speech gradually accommodates to these changes.

While the existence of 'motherese' has been documented and confirmed, its function has not been clearly defined. Whether the mother's speech bears no influence on a child's acquisition of language, whether it is closely-tailored to the child's linguistic requirements, or whether it

has a multitude of purposes, among which are attention-getting and holding devices, the issue is complex and in need of detailed study. The study of deprivation (such as that of hearing) in early life may contribute towards establishing the relative importance of stimulation, or the linguistic environment, in the language acquisition process. A child deaf from birth has the unfortunate prognosis that he will be language-delayed, at the very least. A mother who is aware of this and who involves herself in a parent-training program to learn how to most effectively feed in experiences and language to her child can do much to foster his being able to function orally in a hearing world. The purpose of this study is to provide a descriptive analysis of the linguistic environment of a congenitally-deaf infant during a critical period of his language development process--his first year of life. The premise is held that the linguistic environment (both quality and quantity) is important for <u>any</u> child learning language, but is especially so for the deaf child who is at a distinct disadvantage even before his hearing peer utters his first word.

It is known that a hearing-impaired infant coos and cries the same as a hearing baby through the first few months of life. The hearing child continues to extend the variety, duration, and use of his vocalizations because of his pleasure in hearing his own voice and the reinforcement from his mother in the form of imitations, sound plays, and affectionate responses to his own sounds. The hearing-impaired child receives significantly less of both types of reinforcement, and quite likely his vocalizations are soon extinguished. Phillips found that mothers are

dependent on their children's verbal feedback in order to know how to adjust their own speech performance. If a hearing-impaired infant soon completely ceases to vocalize, what happens to the mother's speech? I hypothesize that just as the frequency of the infant's vocalizations decrease, so too will the frequency of the mother's utterances decrease because of lack of verbal feedback. Mothers, too, would seem to need some sort of reinforcement in order to continue feeding language into their children, and a decline rather than an increase in their child's verbal responsiveness would probably discourage the mother from talking very much.

A second hypothesis that will be explored is that the mother gradually uses more and more utterances that comment on or narrate the child's behavior, and fewer utterances that in structure demand a response from the child (imperatives and questions). In other words, the mother's expectations will be realistically tailored to fit her hearing-impaired child. Therefore, there will be some deviation in the usual features of Baby Talk.

METHOD

Subject

The mother-infant dyad for this study was selected from among the participants in the Parent-Infant training program at Central Institute for the Deaf, St. Louis. Mrs. T. is familiar with the program, having gone through it several years earlier with her first child. This child, a daughter, is profoundly deaf, of an unknown etiology. Kenny, the subject in this study and the youngest of Mrs. T.'s three children, was born October 26, 1976 and is the second hearing-impaired child in a family with no previous history of deafness. Kenny's hearing loss, also of unknown etiology, was suspected from about two weeks of age, and confirmed several weeks after that. Electric response audiometric test results, shown below, indicate a severe to profound hearing loss in both ears. Indications are that it might be a progressive loss.

	500 Hz	1000 Hz	2000 Hz	4000 Hz
Maximum output of instrument:	100 dB	100 dB	95 dB	100 dB
ERA test results of 12/29/76				
Right Ear	Not tested	NR*	NR	NR
Left Ear	85	90	NR	NR
ERA test results of 9/30/77				
Right Ear	NR	NR	NR	NR
Left Ear	NR	NR	NR	NR

* NR indicates No Response

Kenny received his first hearing aid (for the left ear) in February, 1977, at the age of four months. His aided response to detection of sound in the field occurred at 35 dB. He was given a more powerful aid after his second HRA test, but for a while his earmold didn't fit well so that his use of the aid was inconsistent. Kenny has no other known problems, and is developing normally in all other areas. Mrs. T. and Kenny entered the Parent-Infant program in January, 1977.

Mr. and Mrs. T. are both in their early thirties, and college-educated. Mr. T., with a Master's degree, is engaged in a professional career. The parents are bilingual, but speak English to their children.

Procedure

The data were collected during the scheduled visits of the mother and child to the Parent-Infant home demonstration center for training and counseling. Mothers are aware of and accustomed to the videotaping which is done for teaching purposes while the counselor observes, guides, or directs the mother-and-child interactions. For the purposes of this study, however, it was necessary to analyze unstructured mother-child interactions, without the counselor there. For the first three tapes, five minutes of such interactions interspersed throughout the 30-minute session were selected and recorded. On the last two tapes, the videotape[1] was started at least five minutes before the counselor came in to begin the session. The home-like decor and furnishings of the center provided a naturalistic setting.

The taping sessions for this study commenced when the child was 4½ months old, and continued thereafter approximately every two months until he was 12½ months old. Table 1 displays the date of tapings and the age of the child at each session.

1. Videotaping equipment used was Sony AV-3600, ½" tape, black and white, reel to reel.

Table 1: Dates of Taping Sessions and Age of Child

Tape Number	Date	Age of Child
1	3 - 16 - 77	4½ months
2	5 - 18 - 77	6½ months
3	7 - 13 - 77	8½ months
4	10 - 20 - 77	11½ months
5	11 - 17 - 77	12½ months

Transcription

The material was transcribed from the five minutes of the tape during which the counselor was not present. (See Procedures) Transcription began from the first utterance of the mother or vocalization of the child. Maternal utterances have been defined as words or sounds spoken together on one breath and/or spoken without a noticeable pause in the speech. Child vocalizations included all non-vegetative sounds, both non-distress and distress vocalizations/sounds. For five minutes, all utterances of both the mother and child were recorded on specially-prepared data sheets. Note was taken of when vocalizations of mother and child occurred sequentially or simultaneously.

Coding

After a complete transcription was obtained for each taping session, each maternal utterance was coded, using the manual developed by Anderson (Appendix 1), as to Form, Content, and Function. If the maternal utterance occurred within three seconds following the child's vocalization, then it was also coded as to type of Response to Child Vocalization.

The following categories were included under each code. For operational definitions and guidelines for transcription and coding, see Appendix 1.

Form of Utterance

1. Question
2. Imperative
3. Declarative
4. Exclamation

Content of Utterance

1. Interpretation of Child's State
2. Object references
3. Non-object, interpersonal references

Repetition of Content

Function of Utterance

1. Attempting to elicit a turn or response from child
2. Acknowledging a turn by the child
3. Narrating
4. Taking the child's turn

Type of Response to Child Vocalizations

1. Pure imitation
2. Verbal, non-imitative response
3. No response
4. Verbal response to crying or fussing

Simultaneous Response

Reliability

Measures of inter-rater reliability were obtained to strengthen the findings of this study. After a transcription was made of the first tape, two raters independantly coded it for Form, Content, Function, and Responsiveness. They then met to compare codings, discuss differences, and revise the coding manual as necessary. Next, each rater took a copy of the transcriptions of the second, third, fourth, and fifth tapes and again coded them independently. When the raters met to compare codes again, they went through the data sheets and made a note of the coding errors made by either rater on each maternal utterance for each category (Form, Content, etc.). The number of disagreements in each category, relative to the total number of maternal utterances for that tape formed the reliability percentage for that tape. Errors of commission and omission in the Content Repetition code were also scored for reliability.

As can be seen from Table 2, the categories Form and Responsiveness yielded the highest inter-rater reliability. The averages were 98% and 99%, respectively. The category of Function yielded an average of 83.5% agreement between the raters on the four tapes, but still shows a fairly high degree of reliability.

In general, it can be said that there is a high degree of consistency between raters in coding each category.

Table 2: Inter-Rater Reliability

Tape No.	Form	Content	Content Repetition	Function	Response to Vocalization	Total No. Maternal Utterances
2	99%	99%	97%	85%	99%	100
3	99%	95%	98%	87%	100%	93
4	99%	91%	96%	74%	100%	117
5	95%	95%	94%	88%	—	147
Average:	98%	93%	96%	84%	99%	114

RESULTS

General

Figure 1 shows the frequency of maternal utterances overlapped in time with the frequency of child utterances. Table 3 describes the child's utterances in terms of frequency and type, and in addition gives the mean length and frequency of maternal utterances for each transcription. As shown by Figure 1 and Table 3, the frequency changes of maternal utterances follow closely the changes in frequency of child utterances through the first three tapes. While the child's utterances continue to drop to zero by the last tape (age 12½ months), the mother's utterances take a sharp turn upward in frequency. That the number of maternal utterances on the last tape was almost the same as the number on the first tape was an unexpected finding. Because the mother is participating in the Parent-Infant program, where parents are trained to provide a lot of verbal input to their children before any response from the child can be expected, it is probable that the effects of this training are being seen in this increase in frequency of utterances. The fact that this child is the mother's second hearing-impaired child would add personal experience to the training effects. However, a factor that cannot be discounted in regard to the low frequency of utterances on the third tape, especially, is that possibly the mother just didn't feel like vocalizing very much on the day of that taping session, due to illness, other thoughts on her mind, and so on. Another consideration in this issue of frequency of maternal utterances

is that, although the child's frequency of vocalizations decrease by the fourth and fifth tape, he is physically more mature and involved in his environment. Mrs. T. may rely less on the child's verbal abilities and adjust her speech performance to suit his physical behavior.

Table 3 also shows the mean length of maternal utterance (MLU) for each tape. Sound plays (such as 'Tickle-tickle-tickle') were not included in the tabulation because they were so abundant and in such long strings that their inclusion would result in misleading figures. The small MLU values over all the tapes indicate the mother's consistent use of short, simple sentences, a finding which is consistent with Snow's study of mother's speech to their hearing infants. (1977)

The decrease in number of child utterances has already been discussed, but it is interesting to note the distribution in type of utterance. At age 4½ months, the child is still behaving as any hearing infant of that age: he laughs and vocalizes (coos) a great deal, and the effects of his hearing impairment on receiving feedback from his mother may not yet have taken hold. Just two months later, however, when most infants are babbling, experimenting with and enjoying the sounds of their own voices, Kenny's utterances have dropped more than 50% in number, and he laughs only once in the five minutes, as compared to his twenty-six laughs two months earlier. The amount of stimulation through play and attention from the mother is relatively constant throughout all the taping sessions, so that one critical variable seems to be the cumulative effect of the hearing impairment on the child's "motivation" to vocalize.

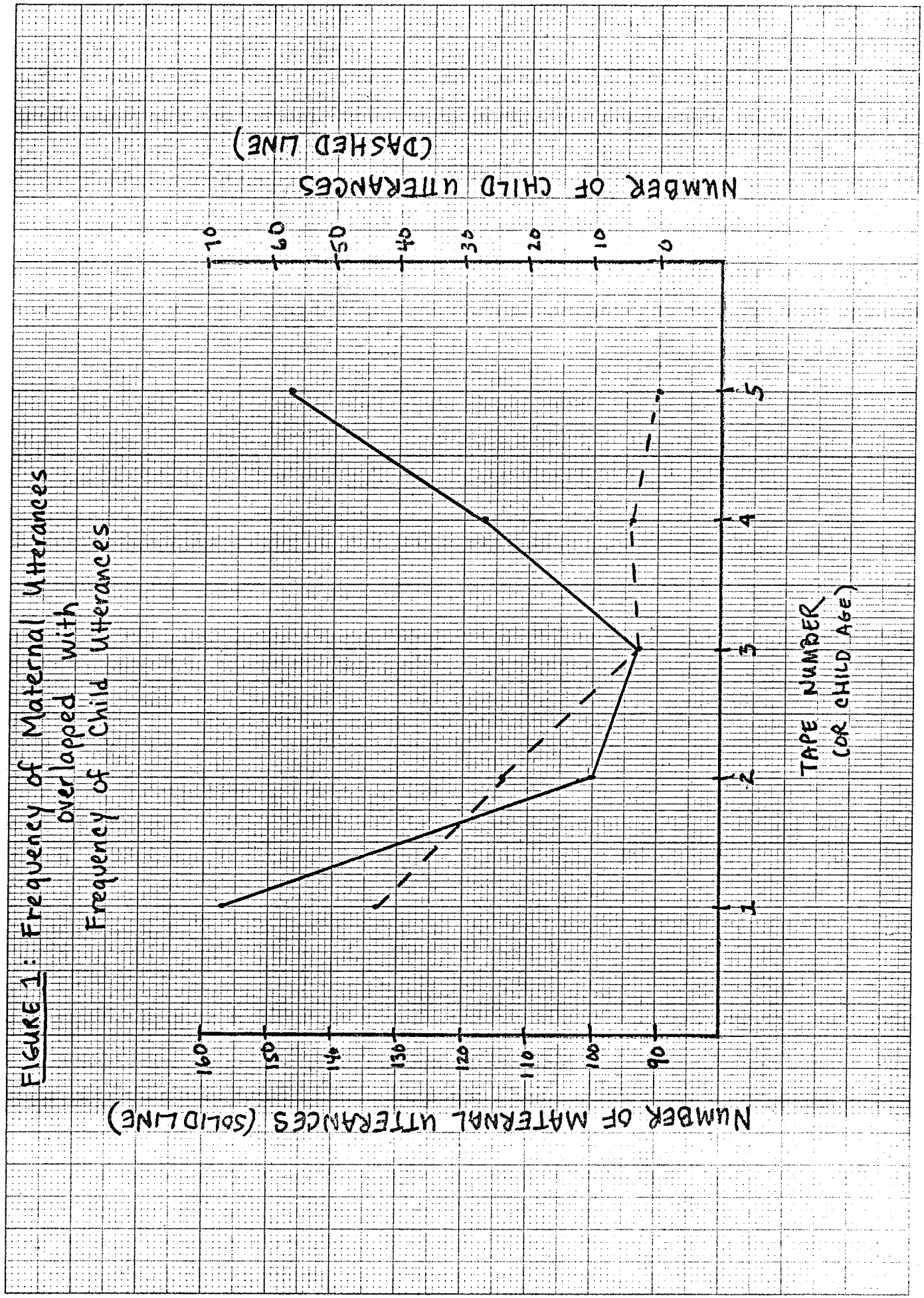


FIGURE 1: Frequency of Maternal Utterances Overlapped with Frequency of Child Utterances

Table 3: Frequency and Type of Child Utterance, and Frequency and MLU of Maternal Utterances over Time

Tape No.	1	2	3	4	5
Child's Age	4½ mos.	6½ mos.	8½ mos.	11½ mos.	12½ mos.
Total Child Utterances:	43	14	3	4	0
Types:					
Vocalize	14	9	3	4	-
Cry/Fuss	3	4	-	-	-
Laugh	26	1	-	-	-
Total Maternal Utterances:	157	100	93	117	147
Mean Length of Utterance:	4 words	4 words	4 words	3 words	3 words

Form

Figure 2 illustrates the changes in the form of the mother's utterances over time. Questions, imperatives, declaratives and exclamations are charted as percents of the total number of utterances for each tape. The graph reveals a definite peak and valley of the imperative and exclamatory forms, respectively, on the third taping session. It should be recalled that the frequency of the mother's utterances was the lowest on this tape. Since most of the exclamatory forms in the mother's speech were sound plays and laughter, perhaps a low point in exclamations and utterances was reached because of the mother's lack of inclination to talk or play very much that day.

It is clear from the graph that no one form consistently dominated Mrs. T.'s speech over time. Her use of questions, however, remains minimal throughout and in this regard her speech differed from the question-dominated baby talk typical of most mothers to their normally-hearing infants. (Snow, 1977) This could be an individual speech style, or it could be an accomodation such as Erwin-Tripp (1977) described: some features [of Baby Talk] are changed as a result of expectations and feedback regarding the listener's comprehension.[2] Mothers of hearing infants use questions which by their terminal raised pitch elicit the child's attention, but perhaps Mrs. T. instinctively knew that Kenny would not hear the raised pitch, so she chose to use other forms instead.

2. Erwin-Tripp, S. A Psychologist's Point of View, In Snow C. and Ferguson C., Talking to Children p. 338

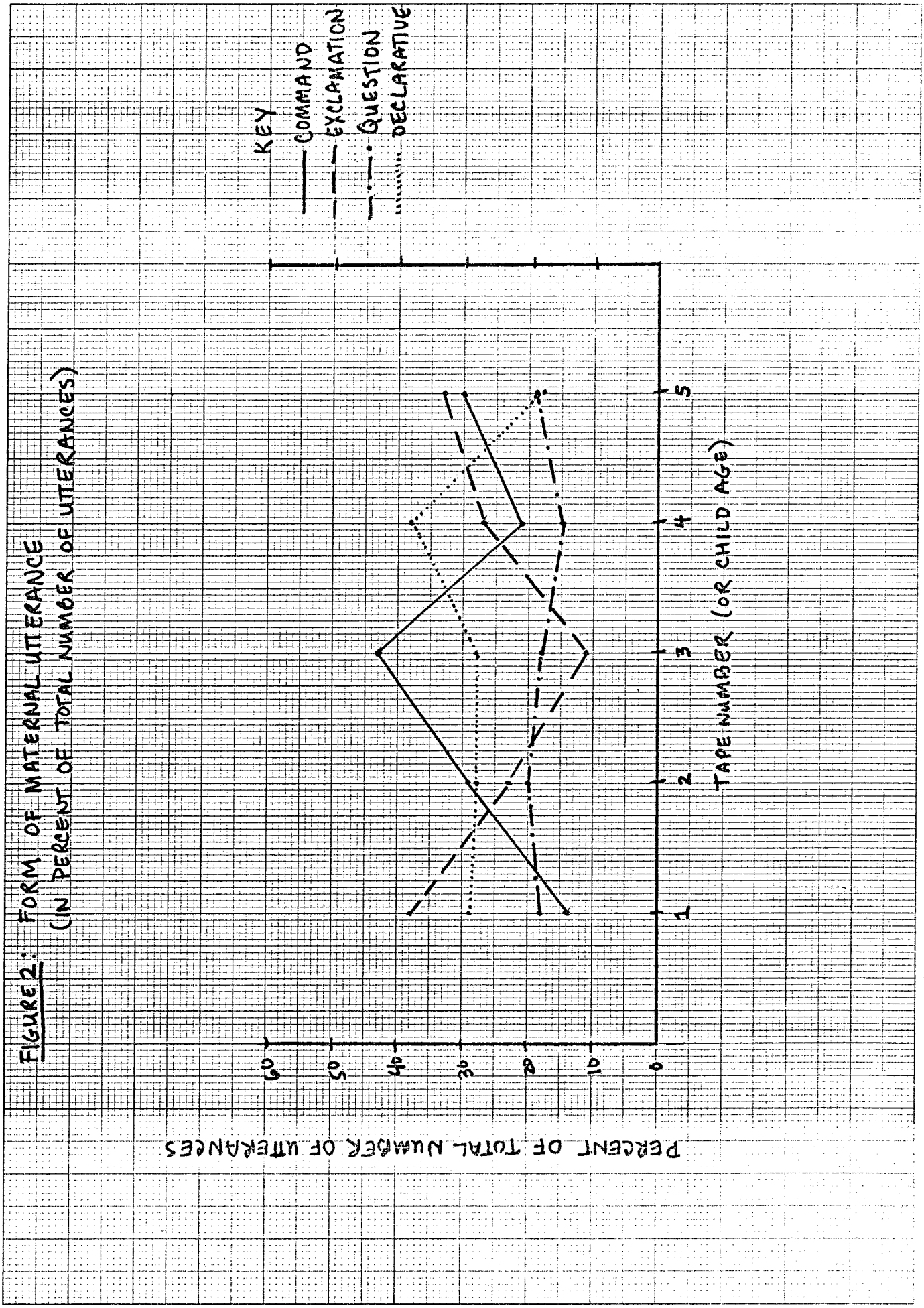


FIGURE 2: FORM OF MATERNAL UTTERANCE (IN PERCENT OF TOTAL NUMBER OF UTTERANCES)

Content

Figure 3 indicates a dramatic rise in object-related utterances by this mother over time. At the same time, her references to the child's state and feelings steadily dropped. Interpersonal comments remained at around 50% until the last tape, where they dropped significantly by half. Whether this was the beginning of a trend or a one-time occurrence cannot be ascertained from the data, although the former is suspected because of the steady increase in object-related utterances.

The increase in object-related utterances is not unusual, considering the fact that, as babies mature, they naturally become more interested in toys and objects. While talking to the child, the mother naturally refers to those specific objects with which the child is engaged. The decrease in utterances not referring to the child and the increase in references to the environment confirm the findings of Snow (1976) who found that this change in content started at age 5-7 months in the two dyads (normal-hearing) which she studied. The start of this trend for Mrs. T. is approximately at the child's age of 6½ months, so that in this respect the content of their communication parallels that of dyads with hearing infants.

Table 4 summarizes the extent of repetition of maternal utterances both in terms of frequency of occurrence in each content category and percentage of each category. Overall, Mrs. T.'s speech reveals a significantly high degree of repetition, averaging 29% across all content categories. This tendency to repeat the content of her utterances appeared proportionally similar in all three categories:

references to the child's state, object references, and interpersonal comments. As the number of utterances referring to the child's state dropped to near-zero, so too did the number of repetitions within this category fall, as would be expected. The same is true for the decrease in repetitions and actual number of interpersonal utterances on the fifth tape. The percentage of repetitions in this category otherwise averages around 18.6%, or almost a fifth, of the total number of interpersonal comments, which is not a very significant number.

Object references, which claim the most in frequency of distribution alone, also show a high percentage of repetition within that category, averaging out to 32.4% for all five tapes. Table 4 shows that on the fourth tape, 42%, or almost half (27) of the 65 object-related utterances, were repetitions. Repetitions for this category were the highest, probably because the reference (the toy or object) could be fixed in time and space (unlike attitudes, feelings, or preferences) and therefore the same thing could be said about it, over and over.

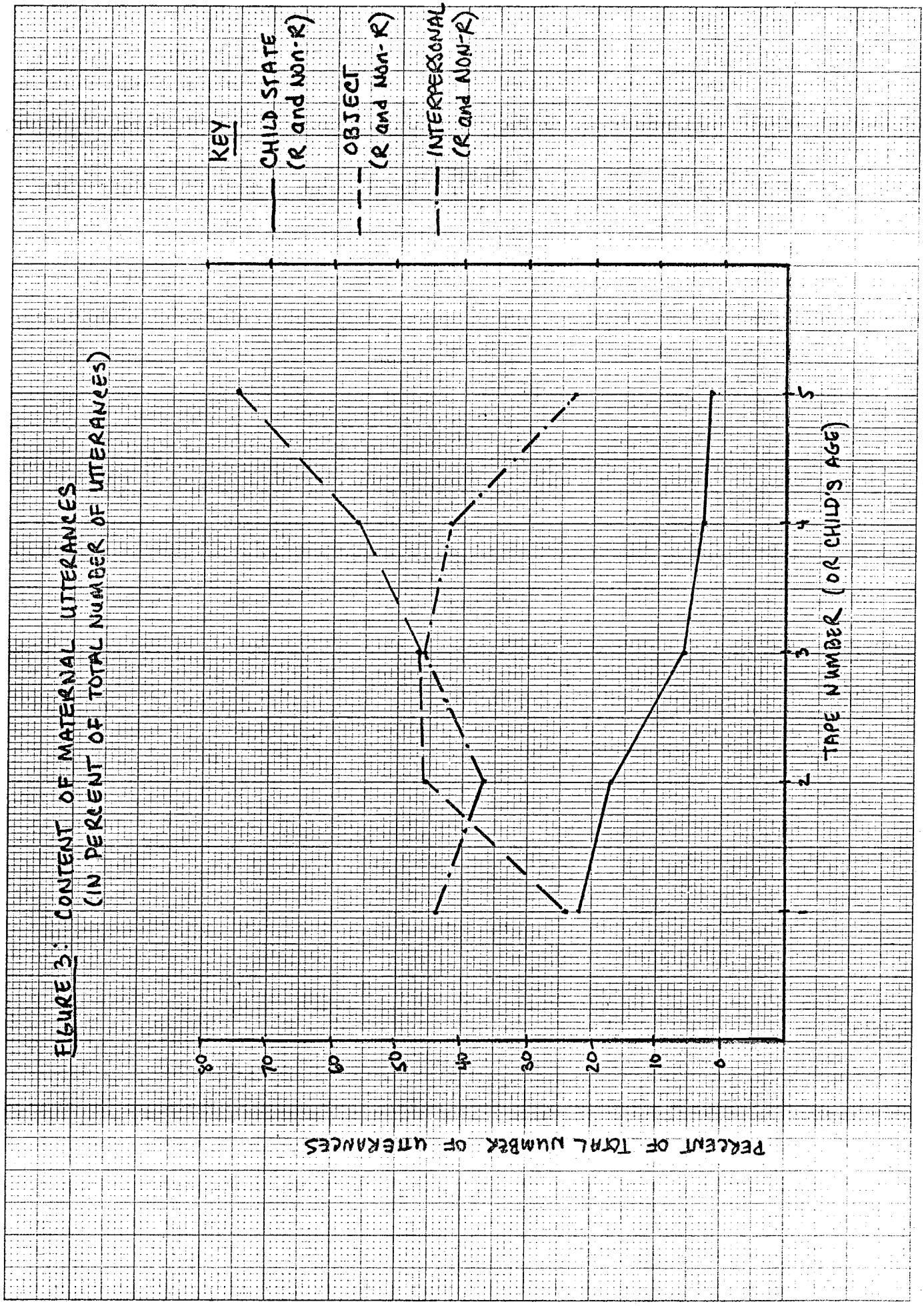


FIGURE 3: CONTENT OF MATERNAL UTTERANCES (IN PERCENT OF TOTAL NUMBER OF UTTERANCES)

Table 4: Frequency and Percent of Content Categories and Repetitions

Content Category:	Frequency*	% Total Utterances**	Frequency of Repetition	% of this Content Category
Child State				
Tape 1	35	22%	15	43%
2	17	17%	7	41%
3	6	6%	-	-
4	3	3%	-	-
5	3	2%	-	-
Object Reference				
Tape 1	37	24%	10	27%
2	46	46%	11	24%
3	44	47%	13	30%
4	65	56%	27	42%
5	110	75%	43	39%
Interpersonal				
Tape 1	85	54%	13	15%
2	37	37%	9	24%
3	43	46%	15	35%
4	49	42%	9	18%
5	34	23%	2	6%

* includes content repetitions as well as non-repetitions

** all percentages have been rounded off to the nearest whole number

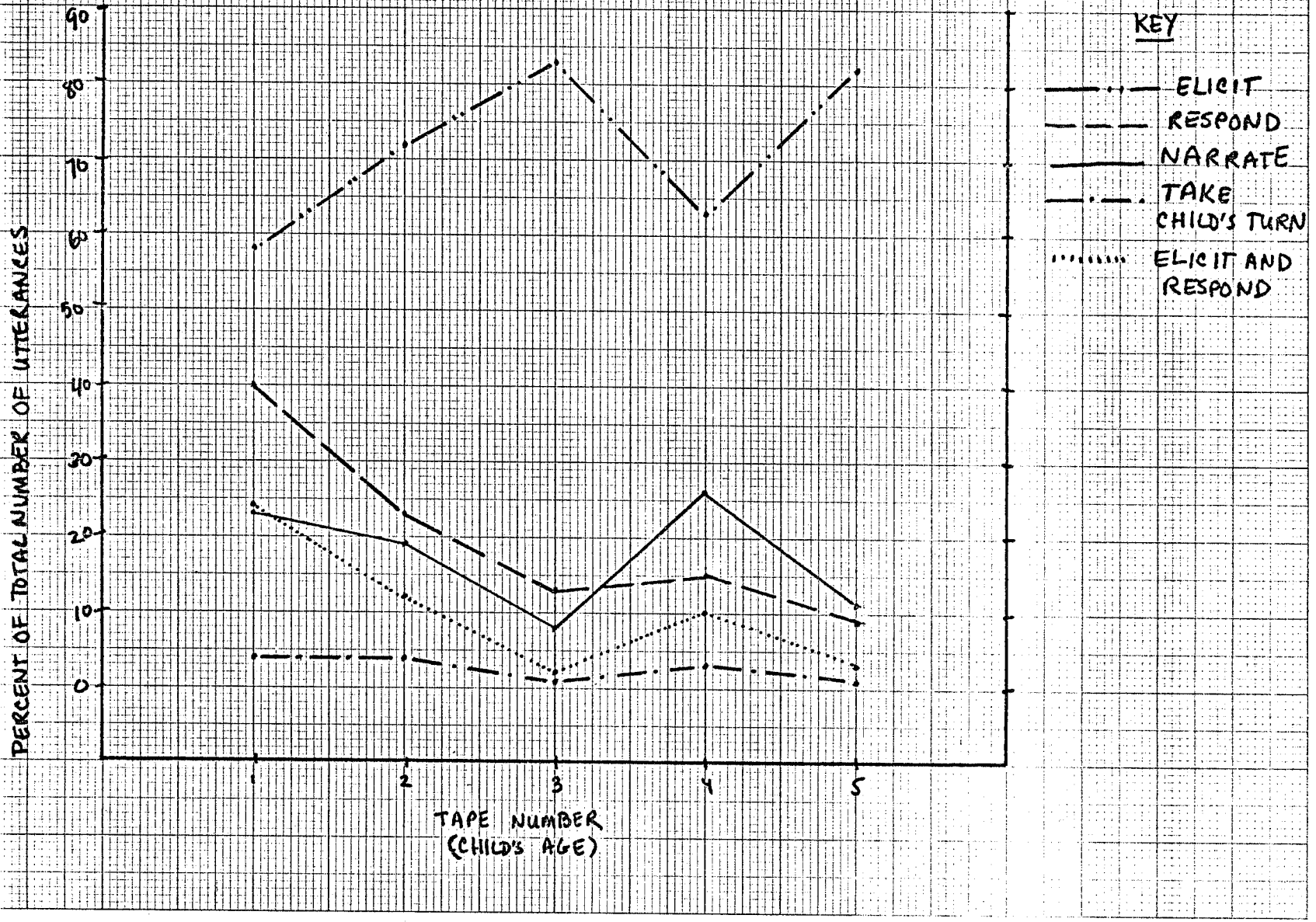
Function

Figure 4 demonstrates the change in type and frequency of maternal utterances in regards to function, over time. The outstanding feature of the graph is the consistently high percentage of maternal utterances which were spoken in order to elicit a response from the child. Never once did this single category command less than 50% of the total number of her utterances. On the other hand, those utterances which served to take the child's turn were few in number, never comprising more than 5% of the mother's total number of utterances. Individual maternal speech styles would seem to determine the frequency and proportion of utterances which serve to take the child's turn.

Acknowledgements of the child's verbal or physical behavior as an intentional act were most frequent (25 - 40%) for the first two taping sessions; thereafter they dropped to approximately 10% of the mother's total utterances. Since the number of child vocalizations is also highest for these same two sessions, it is possible to speculate on one causal relationship. However, as a child matures and becomes physically involved with his environment (through toys, play, etc.), a mother usually interprets the child's behaviors (disregarding vocalizations) as conversational 'turns' to which she can respond. (Snow, 1977) Mrs. T. apparently did not acknowledge as many of Kenny's behaviors as intentional, as one would have expected.

Maternal utterances which served both to acknowledge a turn of the child and to elicit another response at the same time (double-coded) remained low in percentage of all Mrs. T.'s verbalizations. As could be expected, the peaks and valleys mirrored those of the

FIGURE 4: FUNCTION OF MATERNAL UTTERANCES
(IN PERCENT OF TOTAL NUMBER OF UTTERANCES)



'acknowledging a turn' utterances since all occurrences of the latter were included in the count of the double-coding. The mother's general tendency not to respond to Kenny's behavior as if it were intentional is reflected in the low percentage of double-function utterances.

Mrs. T.'s use of narration averaged out to be about 17% of the total number of her utterances. It reached a peak of 26% at the same point where the utterances meant to elicit a turn from the child dropped to a low of 63%. The transcription of the fourth tape, where this occurs, indicates that most of the narratives were repetitions of one or two comments made about a toy, which seemed to 'fill in' gaps in the conversation.

Because the mother's speech overwhelmingly was spoken in order to elicit a response or attention from the child, I was interested in seeing how many of these utterances were repetitions of the same theme or content. Frequencies of repetitions of the same theme or content were derived partly on the basis of content (with object reference direct or indirect) and partly on the basis of form.

An example of a series of utterances which serve to elicit the same response (getting the ball) from the child follows:

Here's the ball.
Come on.
Come get the ball.
Come get the ball.
Come on.
Ah, don't be bashful.
Hey stinker, come get the ball.
Come here.

The frequency of repetitions was tabulated as to how many utterances <u>in sequence</u> were attempts to elicit the same specific

response from the child. Table 5 illustrates the number of times the mother used one, two, three, or four or more attempts in sequence to elicit a response from the child. The table shows that the mother predominately used only one utterance with no repetitions to elicit a response from her child. These figures do not reveal the interrupted sequence of attempts very typical of this mother, in which almost every other utterance refers to the same eliciting attempt. Thus, in a sequence such as the following, a series of four attempts to elicit the response of getting the ball cannot be counted because of the "It goes bouncy-bouncy." inbetween.

Come on, go get the ball.
It goes bouncy-bouncy.
Come on.
Kenny.
Come on, bring it over here.

A unit of analysis other than this sequential utterance count would seem to be needed, then in order to describe fairly Mrs. T.'s use of repetition.

In the '4 + ' attempts category, sound plays as well as phrases and sentences were included, and a string of eight attempts to elicit the same response was not uncommon. In general, the proportion of numbers of attempts to elicit a specific response remains the same for all the tapes, with the greatest number of utterances being single attempts, and with the smallest proportion being strings of four or more related utterances. The significance of this consistent proportion is that, by the fact that most of her utterances are single attempts to elicit responses, it may be concluded that Mrs. T. is quickly shifting both the content and function of her vocalizations in order

to accomodate the child's immediate interests and preferences. If Kenny shows interest in a toy or game, Mrs. T. will persist in eliciting (or attempting to elicit) a specific response from him. An infant, however, often has a very short attention span and typically does not persist in any one activity for very long. This explains the dearth of long strings of utterances attempting to attract or maintain the child's attention to one object. Interrupted sequences such as the following often occur, where the mother's strategies quickly change from trying to interest her child in a toy, to talking about something he shows interest in instead, to trying to maintain his interest in that even as his interests change again, and so on.

Where are you going?
Want to play ball? (mother tries to distract child)
Want to play ball?
Kenny.
See the lights? (mother picks up on child's interests)
Those are lights.
Where are you going?
Kenny, come back here.
You love lights, don't you? (mother tries to maintain child's interest)
Kenny, come here.
Kenny.
Kenny, I'm gonna get you. (mother changes strategies to suit child)

As the child gets older and is more able to focus on one thing for a longer period of time, one would expect the number of attempts to elicit a response to decrease (in favor of responding more to the child's behavior) and for those utterances which do serve to elicit, there would probably be an increase in the number of two, three, or even four-attempt utterances as a reflection of maternal response to

the child's matured attention span.

Table 5: Frequency and Number of Attempts to Elicit Same Response from Child

Tape No.	One Attempt	Two Attempts	Three Attempts	Four or More Attempts
1	44	11	7	1
2	22	14	2	3
3	23	9	2	5
4	28	12	2	4
5	49	16	8	3

Response to Child Vocalizations

Table 6 relates the number and types of maternal responses to child vocalizations over the nine month period. Vocalizations simultaneous with those of the child are included in the figures. In these cases, the child's vocalization (usually laughter) was counted only once, even though he may have laughed long enough for the mother to deliver two or three utterances simultaneously. Percentages of response types in terms of the total number of maternal utterances for each tape are also shown. Except for the fourth tape, most of Mrs. T's responses fall heavily in the category of verbalization or vocalization in response to child vocalization. Mrs. T. responded 100% of the time to Kenny's vocalizations when he was 4½ months old, but as the number of his utterances dropped sharply by age 6½ months, so too did Mrs. T.'s responsiveness fall, although not as dramatically. In one instance the baby vocalized and the mother made no response, but on each of the baby's other 13 utterances the mother responded with either an imitation (two times) or a vocalization. By the fourth tape, Kenny's utterances were almost non-existant; yet, when he vocalized two times within a few seconds, the mother made no response either time. The reasons for this lack of response are not clear: by the way in which the mother sighed and talked to herself immediately after the child's vocalizations, however, it is likely that she had other thoughts on her mind than to reinforce her son's spontaneous vocalizations.

The aspect of repetition in verbal response to a child's vocalization is interesting here, too, in order to see how many related utterances the mother uses to respond to the child's one vocalization before he either vocalizes again or she changes the theme. The same

criteria for tabulating repetitions were used here as for determining repetitiveness in attempts to elicit a response. Only responses to the infant's positive vocalizations (Code 2) were considered. The results are shown in Table 7.

The first tape had the greatest number of child utterances, which occurred so frequently as to cut short anything the mother had to say. Thus, the number of one-utterance (non-repetitive) responses to child utterances was highest for that tape. Still, there was enough opportunity for the mother to repeat, reformulate, or expand her initial response to the child, as can be seen from the figures on two, three, and four-plus references to the same utterance. The same proportion of figures exists for the maternal responses on the second tape, even though the frequency of child utterances was much less. Again, though, the figures do not reflect the interrupted sequence of utterances which are typical of this mother. On the fourth tape, where the child vocalized three times but the mother only responded once, that one response consisted of a series of five utterances in which Mrs. T. acknowledged the child's vocalization as intentional, attempted to elicit another one in turn, and also spoke for the child.

In general, then, a very high proportion of the child's vocalizations were responded to by the mother. These responses were predominately verbalizations and vocalizations.

Table 6: Type, Number, and Percentages of Maternal Responses to Child Vocalizations*

Tape Number:	1	2	3	4	5
Imitate	13	2	-	1	-
% of Total Maternal Responses**	10%	11%	-	25%	-
Verbalization/ Vocalization	48	10	3	1	-
% of Total Maternal Responses	68%	56%	100%	25%	-
No Response	-	1	-	2	-
% of Total Maternal Responses	-	6%	-	50%	-
Verbalization/ Vocalization to Cry or Fuss	10	5	-	-	-
% of Total Maternal Responses	14%	28%	-	-	-
Total Child Utterances	43	14	3	4	0

* includes both simultaneous and sequential utterances

** sequential utterances only

Table 7: Number of Repetitions Mother makes in Verbal Response to Child Vocalization

Tape Number	One Reference	Two References	Three References	Four or More References
1	21	10	6	1
2	4	2	1	-
3	3	-	-	-
4	-	-	-	1
5	-	-	-	-

Discussion

This study has shown that a form of Baby Talk is indeed being used by this subject, but it has been adjusted to suit the individual style of the mother and the abilities of the child. Repetitive, short, simple utterances that were semantically related to the child's interests were just as characteristic of this mother as any other mother. The only outstanding difference between the speech of this mother and that of a mother speaking to her normally-hearing infant as described by Snow (1977) is in the form: questions were the form least used by this mother. No one form characteristically dominated her speech, although imperatives and declaratives averaged the highest in frequency of use.

Evidence for interaction through a conversational mode also exists. While the percentage of maternal questions and imperatives is not as great as that indicated by Snow in her study, it is the function and not the form of the communication which is the critical variable. The results show that an overwhelming proportion of the mother's utterances were said in order to elicit a response from the child, just as was seen in the earliest mother-infant interactions in Snow's study. Most of Kenny's own vocalizations were responded to, as well. According to Snow, in a dyad with a hearing infant, this level of conversational interaction exists only until the child's vocalizations have increased and matured. Mrs. T., on the other hand, may be acknowledging her child's delay in developing into a competent conversational partner by extending her use of utterances which attempt to elicit a response,

as well as by her use of repetitions. The content of her utterances, unaffected by the child's linguistic abilities, develops normally, as would be expected.

The elements of a mother's speech to her infant are an important factor in the consideration of the optimal condition under which a hearing-impaired child should learn language, since the pre-linguistic years form an important foundation for language learning for any child. In addition, results from Levenstein's study (1970) suggest that the earlier and more intensely mother and child are stimulated to engage in conversation around a common activity, the greater and more enduring the gain in IQ achieved by the child.[3] The quality as well as the frequency of the mother's utterances are critical variables during the first year of a hearing-impaired infant's life. The mother needs to talk normally and naturally to her child in order to familiarize him with the fact that talking is something natural that occurs all the time, even if he can't hear it. At the same time, the simplicity and redundancy of her speech must be extended for a longer-than-usual period of time because of the delay in linguistic development brought on by the hearing impairment. In order for the child to mature socially as well, the mother of a hearing-impaired infant must take care that communication is not always one-sided; that is, reciprocal conversational interactions (as described by Snow) must be the rule. This involves not only using language devices such as questions and commands to try and elicit a response from the child, but also include responding to any and all child vocalizations as intentional 'turns'. According to

3. Levenstein, P. Cognitive growth in preschoolers through verbal interaction with mothers. In Bronfenbrenner, U. "A Report on Longitudinal Evaluations of Preschool Programs. Volume II: Is Early Intervention Effective?" DHEW Publication No. 76-30025 1974

Snow, maternal expectations about infant's abilities both arise from and are tested by the nature of the interaction mothers establish with their babies.[4] If a mother establishes a natural social and linguistic environment early on for her hearing-impaired child, her expectations and his abilities as well will be favorably affected.

4. Snow, C.E. "The development of conversation between mothers and babies", Journal of Child Language 1977, 4 (1) p. 21

Appendix A

Manual for
Coding Parental Utterances to Young Children
Form, Content, Function, and Responsiveness

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General Guidelines

Rules for recording and coding parental utterances from videotape

1. An utterance is temporally defined in this instrument. An utterance is those words or sounds which are spoken together on one breath and/or spoken without a noticeable pause in the parent's speech. An utterance may be a single word or sound, a simple sentence, a compound or complex sentence, or a string of simple, compound, or complex sentences.

2. Write the entire utterance on the coding form.

3. Each parental utterance will be coded as to its FORM (four categories), CONTENT (three categories), and FUNCTION (four categories). If the parental utterance occurs in response to a child vocalization, the parental utterance is coded as to the TYPE OF RESPONSE TO CHILD VOCALIZATION (four categories).

4. When the utterance recorded is a complex sentence, code only independent clause as to its Form, Content, and Function.

5. When the utterance recorded is a compound sentence, select the component simple sentence which has the lowest numerical category for FORM and code the Form, Content, and Function of this simple sentence only. If the simple sentences which make up the compound sentence have the same numerical category, use the first simple sentence in the utterance for coding Form, Content, and Function.

   Form #3, Declarative Form #2, Imperative

   E.g. I know you don't like it, but you've got to wear it.

   For this compound sentence, code Form, Content, and Function of "you've got to wear it."

   Form #3, Declarative. Form #3, Declarative

   E.g. You like me, and I like you.

   For this compound sentence in which simple sentences have the same Form category, use the simple sentence "You like me" for coding Form, Content, and Function.

6. If parent utterance interrupts and occurs simultaneous with a child vocalization, indicate this with brackets on the left margin of the coding form.

Rules for recording child vocalizations from videotape

1. If child vocalization is not a recognizable word, indicate child's vocal response by writing "VOC.".

2. If child vocalization is a word or approximates a speech sound, transcribe it as accurately as possible.

3. If a child vocalization interrupts and occurs simultaneous with a parental utterance, indicate this with brackets on the left margin of the coding form.

Categories for Parent Utterances

FORM OF UTTERANCE

Form is decided on the basis of syntax and intonation.

#1 Question, includes

A. Subject-verb inversions; "wh" questions

B. Tag-questions, eg. You like that, don't you?

C. Post-completers with rising intonation, eg. Huh?; Mmmmmmmm?

D. Declarative or imperative statements or fragments spoken unambiguously as a question with rising intonation.

Eg. You want to hold the clown?
See the light?
No?

E. Rhetorical questions spoken without rising intonation

Eg. What am I going to do with you?

#2 Imperative, includes

A. Commands, suggestions with or without an initial "let's" or "you" before the verb. Based on syntax.

Eg. Let's eat this spoonful.
Eat this spoonful.
See the light.
You give that to Mommy.
Say, "Give me more, Mommy."
Don't be bashful.
Looky here, Mommy has a ball.
Look, there's the ball.

B. Short, stereotyped, contentless commands

Eg. Come on.
Stop.
Look.
Be good.
Look here.
No, no, no.

#3 Declarative statements or fragments and extended exclamatory sentences, include

A. Complete sentences, phrases, or single-word utterances which are not spoken with a question intonation and which are not in the imperative form. Exclamatory sentences of more than three words.

Eg. You like that.
You want to hold the clown.
The light...
You are a happy baby!
Here comes Mr. Frog!

#4 Exclamatory utterance, includes

A. One or two-word exclamations, greetings, sound-play, vocalizations, or laughter which are expressed so as to make up the entire utterance. Simply saying child's name is included.

Eg. Hi, baby.
Uh oh.
Wow!
Boom, boom, boom.
Ba-ba-ba-ba-ba.
Ha-ha.
Andy....
Hi, Jennifer!

B. Stereotyped phrases expressed as the entire utterance.

Eg. Excuse me.
Oh, my goodness.
Oh, no! (not an imperative)
OK.
I know...
Here...

C. One or two-word fragments described in A. and B. above which are part of a longer utterance are not included in this code.

Eg. Oh my goodness, you are messy.
Boom, boom, boom goes your drum.
Ha-ha-ha, you're a silly boy.

CONTENT OF UTTERANCE

#1 Interpretation of child's state, includes

A. Statements which give meaning or intention to the child's ongoing behavior. This is frequently a parent's subjective interpretation of the child's general mood, general reaction to an activity, or statement about the child's current feelings, preferences, motivations or state-of-being. If a concrete object is included in the interpretation, either named directly or referred to indirectly, the utterance is coded a #2, Object Reference.

Eg. You want to look around.
You like that.
What a happy baby!
You're a happy baby.
You are sleepy.
You want to go bouncy-bouncy.
I think you like to crawl.

B. Questions about the child's state-of-being which indicate that the parent has an idea, hypothesis, or suggestion as to the child's feelings. This is often achieved through rising intonation or post-completers. Open-ended questions as to what the child wants or feels in which parent does not give a suggestion as to child's preferences are not included. Questions about the child's state-of-being which include direct or indirect reference to an object are not included.

Eg. Included:

You're tired, aren't you?
You like to crawl?
Are you hungry?
Want more?

Eg. Not included:

What do you want to do?
Where do you want to go?
What shall we play?
You want to see the clown? (Parent question without a cue from the child)
You want to ride the scooter? (Parent question without a cue from the child)

C. Compliments and other of parent's reactions specific to child

Eg. You're a big boy.
What a good baby.
You're a riot!
Silly girl...

D. Utterances in which parent speaks for the child, taking the child's part in the exchange.

Eg. Say, "I'm a happy baby now."
I want to eat now.

#2 Object references, includes

A. Statements or questions which describe or name a specific object which is immediately present. Includes references to child's liking, seeing, tasting, holding, or hitting an object as well as describing an object without direct reference to the child.

Eg. You see the light?
How about another spoonful?
You like that clown.
Carrots taste good.
The light....
You want to go bouncy-bouncy on the bed?

B. Instances in which an object in the immediate setting is referred to indirectly with a pronoun.

Eg. Does it taste good?
Hit it harder.
This is pretty.
It's going to get you!

C. Instances in which an object in the immediate setting is referred to indirectly without using a pronoun or the object's name. The utterance must unambiguously refer to a concrete object (and not to parent).

Eg. Pretty, pretty. (Parent points to picture in book)
Red, bright red. (Parent gives a red ball to child.)
Good? (Parent is feeding child some pudding.)
See? (Parent is describing toy to child.)
Shake, shake. (Parent is shaking the ball.)

D. Instances in which the parent speaks to the child "through" a specific toy.

Eg. Mr. Frog says, "Play with me, Andy."
Boom, boom goes the drum.

E. Parts of child's or parent's body are not considered objects (eg. hands, mouth, eyes). However, clothing and hearing aids are considered as objects.

#3 Non-object, interpersonal references, includes

A. Statements or questions which describe activities, games, or other interpersonal exchanges that do not specifically name an object in the environment, and that are not interpretations of the child's state.

Eg. OK, I won't stop.
What do you want?
Come on.
Huh?
Look here.
Don't hit me!
Hi.
Thank you.
Talk to Daddy.
What?

B. References to parent's own feelings or reactions.

Eg. That was loud! (following child vocalization)
Maybe that's easier.
That's a funny joke.
You don't want to play with me.

C. Imitations of child's sounds; nonspeech vocalizations; laughter

D. Exclamatory utterances described in Form Category #4, except for vocalizations such as "Boom, boom" which refer directly to an object in the immediate setting.

Eg. Excuse me.
Oh, my goodness.
Yeah.
Andy....

E. Prompts or requests for more information from child.

Eg. Huh?
What did you say?
What do you want?

Repetition or reformulation, coded with "R"

A. When the central theme of any coded utterance is repeated exactly, rephrased, reformulated with expansions or simplifications, put the code R by the content category following each repetition of the original utterance.

Eg.	You see the light?	Code 2
	There's the light.	2R
	The light....	2R
	What do you want?	3
	What?	3R

B. A repetition is coded in instances in which a statement is followed by a brief utterance and then is repeated in a general thematic way.

Eg.	You're sleepy, aren't you	1
	Huh?	3
	You are a sleepy boy.	1R
	You're a happy baby.	1
	Yeah.	3
	A happy baby.	1R

N.B. If content is unclear, use category number 3.

FUNCTION OF UTTERANCE

#1 Attempting to elicit a turn or response from child, includes

A. All questions directed to child (i.e. All utterances given Form Category #1).

B. All imperatives directed to child (i.e. All utterances given Form Category #2).

C. Attempts to elicit or maintain child's visual attention or state of arousal through sound-play, talking to child "through" a toy, other tactics to elicit child's attention or to highlight the properties of an object, or simply speaking child's name to gain child's attention.

Eg. Bang, bang, bang.
There's the light.
The frog says, "Hi, Andy."
Here's the clown.
Look here.

D. Nonspeech vocalizations initiated by parent. These are considered as attempts to elicit imitations from child.

E. Attempts to elicit behavioral compliance.

Eg. Don't touch.
That's a no-no.
Now, now, now. (parent trying to soothe a fussing baby.)

F. Attempts to amuse child.

Eg. I'm gonna get you!
Bouncy, bouncy.

G. Laughing which is clearly in direct response to child's behavior or simultaneously with child's laughter. (Double-coded #1 and#2)

#2 Acknowledging a turn by the child, includes

A. Responding as if child's current behavior is intentional or conveys specific information or directions. Often the parent's utterance is fairly brief and stereotyped.

Eg. That's a good boy.
No kidding.
Thank you.
OK.
Yeah, you want to go home.
You don't say.
Alright.
I know you like that.
Oh, my goodness!
You want the carrot.

B. Laughing which is clearly in direct response to child's behavior or simultaneously with child's laughter. (Double-coded #1 and #2)

C. If this utterance which acknowledges the child's behavior as a 'turn' is also an attempt to elicit another turn from the child (i.e., qualifies as Function Category #1), double code this utterance using #1 and#2. Parent is acknowledging one turn and simultaneously attempting to stimulate another. This most commonly is seen in parent's responding to child's behavior with a question.

Eg. Is that the way it is?
Oh, you want to play, don't you?
You want to eat, right?

D. Imitating or vocalizing (nonspeech) in response to child's sounds is double coded as acknowledging child's vocalization as a turn and as attempting to elicit another vocal response from the child.

E. If content shows "R", then repeat code for Function.

#3 Narrating, includes

A. Narrating child's ongoing behavior or commenting on features of the environment without attempting to elicit a turn from the child or acknowledging that the child has taken an intentional turn.

Eg. The light...
You'll never get tired of this game.

B. Responding to child's state, behavior, or vocalizations (interpretation) by describing child without acknowledging child's behavior as a turn. Includes most utterances which are spoken simultaneously with child's vocalizing.

Eg. You're a silly boy.
You're a riot!
You like this game.

C. Brief utterances which 'fill in' the conversation; laughing when not in direct response to a child's turn.

Eg. Now let's see...
Yeah.

#4 Taking child's turn, includes

A. Speaking for the child.

Eg. Do it some more.
Say, "I want to eat, Mommy."
My hand tastes better.
Let's eat now, Mommy.

B. Answering one's own questions. Close attention must be given to parent's answering her own question when the answer does not immediately follow the question utterance.

Eg. There he is. (following parent's asking, "Where is the clown?")
Blue, blue. (following the parent's asking, "What color is your balloon?")

C. If the utterance which qualifies as taking the child's turn also comes directly after child vocalization, double code it #2 and #4.

N.B. If the FUNCTION of an utterance is ambiguous, use Category #3, Narrating.

TYPE OF RESPONSE TO CHILD VOCALIZATIONS

#1 Parent imitates child's vocalization with or without elaboration contingent on child's sound (following, not overlapping). Parental laughter following the child's laughter is also included. If an imitation of the child's vocalization is incorporated into a spoken utterance when responding to child's sounds, code the response #1.

#2 Parent responds verbally, with speech, to child's vocalization. Response is contingent, in alternation with child's sounds. Parental laughter following a child's non-laugh vocalization is included. Parent responds to child's vocalization with a non-imitative non-speech sound.

#3 No verbal or vocal response contingent to or simultaneous with child's vocalization,or fuss/cry, i.e. within three seconds of child's sound. If child vocalizes and parent does not respond verbally or vocally within three seconds, put category #3 in the "Type of Response to Child Vocalization" column on the line on which the child vocalization is recorded.

#4 Parent responds verbally or vocally to child's negative vocalizations (fussing or crying).

S This code is used to modify Categories #1, #2, or #4 when parent's response overlaps with the child's vocalization to produce simultaneous or coactional vocalization in the conversation.

N.B. An imitation is a general approximation of the child's vocalization.

Appendix B

Sample Data Sheet

Name Kenny

Tape 2 Pg. 5

Child	Maternal Utterance	Form	Cont.	Fnct.	R.T.V.
	Hey Kenny	4	2R	1	
	Hard to squeeze	3	2	3	
	You're strong. (said to object)	3	2	3	
	You're more interested in rocking	3	1	3	
Voc					
	Voc (Imitation)	4	3	1,2	1
Fuss					
	I have a funny feeling that you're either hungry or you're tired.	3	1	2	4
Fuss	Are you mad 'cause I took the tape away from you, huh?	1	2	1,2	4S
	You wanted to see it, didn't you?	1	2	1,2	4S
	Uh, oh.	4	3	2	
Voc.					
	Here's my finger.	3	3	1,2	2
	You want my finger?	1	1	1	
Voc					

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