J. Child Lang. 4, 1–22. Printed in Great Britain

The development of conversation between mothers and babies*

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(*Received* 1 *May* 1976)

ABSTRACT

The speech of two mothers to their infants at several points between three and eighteen months of age was analysed. Simplicity of the speech, as measured by MLU, was about the same at all ages, and none of the other features of the mothers' speech style showed any abrupt change at the time the children started to talk. The changes that did occur started much earlier, at about seven months. These findings are incompatible with the explanation that mothers speak simply and redundantly in response to cues of attention and comprehension from the child listener. It is suggested that the mothers interacted with their infants using a conversational model, and that the changes in the mothers' speech reflect their children's growing ability to function as conversational partners.

Studies performed over the past five years have offered evidence that the speech addressed to children of language-learning age is simpler and more redundant than speech to older children and adults. The simplicity is reflected in such measures of syntactic complexity as mean length of utterance (MLU) and incidence of subordinate clauses, both of which are very low in speech to young children (Longhurst & Stepanich 1975, Phillips 1973, Snow 1972*a*). Redundancy, as reflected in type-token ratios (Broen 1972, Phillips 1973) and in incidence of repetition of utterance constituents or entire utterances (Snow 1972*a*), is very high. A more complete review of simplicity and redundancy features in speech to young children is given in Snow (in press).

In addition to these modifications, speech to young children is different from speech to adults in several other ways. Pitch of the voice is higher and prosodic contours are exaggerated (Garnica in press, Remick 1975). A special lexicon of baby-talk words is used, which shows predictable phonological simplification and

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deviation from the adult words (Ferguson, in press). A remarkably high incidence of interrogatives is also typical in speech to young children; as many as 50% of the utterances were found to be interrogatives in one study (Sachs, Brown & Salerno 1972). The question arises why these modifications occur, and why the same modifications have been observed in all the languages and social class groups studied, regardless of sex of the child addressed or sex or maternal status of the speaker (these findings are reviewed in Snow, in press). Even children as young as 4 ; 0 produce many of these same modifications when addressing two-year-olds (Sachs & Devin 1976, Shatz & Gelman 1973).

It seems obvious that the syntactic simplicity of speech to young children must be related to the fact that such speech is semantically very simple. Thirteen samples of mothers' speech to children between 1 ; 6 and 3 ; 2 were analysed in Snow (in press) and were found to encode almost exclusively the same small set of prevalent semantic relations which Brown (1973) found to be typical of children's Stage I speech. The limitation of these mothers' utterances to this restricted set of meanings was the more surprising since most of the children being addressed were beyond Stage I, and presumably were introducing new semantic relations into their speech. Brown suggested that the prevalent semantic relations characterize Stage I speech because they encode precisely those events relevant to pre-operational, sensorimotor intelligence – agency, action, location, possession, etc. This explanation in terms of the children's cognitive capacities must, however, be supplemented by an explanation in terms of the social context of language acquisition, which also limits discussion to these same meanings. When mothers and young children talk together, they typically discuss what is going on about them, as reflected in the almost exclusive use of present tense in the mothers' speech (Snow, Arlman-Rupp, Hassing, Jobse, Joosten & Vorster 1976) and in the concreteness of the nouns used (Phillips 1973). The reference in mothers' speech to events in the here-and-now is emphasized by their gestures (Garnica 1975). It has been suggested that it is the encoding of currently observable events in adults' speech that makes language acquisition possible (Macnamara 1972).

The desire to talk so that children attend to and understand what one says has also been proposed as a source of the syntactic simplicity and redundancy of speech addressed to them (Snow 1972*b*). The fact that adults cannot produce the same modifications when addressing children who provide no feedback (Snow 1972*a*) supports this point of view, as does the finding that children respond differently to different levels of simplicity and redundancy (Friedlander 1968, Shipley, Gleitman & Smith 1969, Snow 1972*b*, Wisdom & Friedlander 1971). The use of higher pitch and exaggerated intonation contour would fit very well into this explanation, since these features have been shown to elicit greater attention in babies (reviewed by Sachs, in press). The case could thus be made that adults are continually monitoring the children's degree of attention and

understanding, and are adjusting various features of their speech so as to maintain the children's responsiveness at optimal levels.

Though this position is attractive, it does not adequately explain all the features of speech addressed to young children. It cannot, for example, account for the high frequency of interrogatives in speech to young children, unless one wishes to make the circular argument that questions are intrinsically attention-getting. Nor can it directly explain why speech to children is more fluent than speech to adults, or why segmentation into utterances is marked by longer and more regular pauses in speech to children.

A crucial prediction of the view that the child listener's attention and comprehension are responsible for the features typical of speech to children is that these features will not appear until the addressee is 1 ; 0–1 ; 2 and able to respond to adult speech differentially. Syntactic simplification would not be expected until the addressee is old enough to process the syntactic form of the speech addressed to him (at about 1 ; 3–1 ; 4, if we make the unwarranted assumption that receptive control of syntax precedes expressive control by about two months). Large amounts of repetition would not be expected before the addressee is old enough to distinguish redundancy levels in speech (about 1 ; 2 according to Friedlander's 1968 findings). Phillips (1973) found that speech addressed to children of 0 ; 8 showed a greater variability in utterance length, ratio of function to content words, number of verbs per utterance, type-token ratio, and percentage of weak verbs than speech addressed to those of 1 ; 6 or 2 ; 4. Phillips interpreted her findings as support for the notion that mothers adjust their speech to their children's linguistic level, and that no adjustment is therefore called for before the child has any language. Similarly, under the assumption that mothers repeat words, phrases and entire sentences because their children do not fully comprehend the original utterance, one would hardly expect to find such repetition to very young children who could not be expected to understand in any case. Although no fully adequate description has been given of the functions of questions in mothers' speech to children, it has been reported that many of these questions are tutorial (e.g. 'What is it?', 'What colour is it?', Snow *et al.* 1976), and that others function as requests for action (Newport, Gleitman & Gleitman, in press) or for clarification of preceding child utterances (Cherry 1976). One would expect that all these various question-types would start to appear only after children had started talking and understanding. Similarly one would expect that the high proportion of imperatives in mothers' speech would not appear until an age when compliance could reasonably be expected.

The present study was originally carried out to test the prediction that the central characteristics of mothers' speech to children would be introduced at 1 ; 0–1 ; 2 or later, and thus to evaluate the explanation that these characteristics are produced in response to cues of inattention and poor comprehension from the child. Since an explanation in terms of attention and comprehension seemed

unable to explain the findings, an alternative hypothesis about the mechanism determining the characteristics of mothers' speech to children is presented.

QUANTITATIVE ANALYSIS

The speech of two mothers to their babies at several ages between 0;3 and 1;8 was analysed. The last two points analysed for each mother can be seen as providing overlap with the studies of mothers' speech cited above. The earlier ages, well before the babies could talk or respond to syntactic features in their mothers' speech, provide the crucial test of the attention and comprehension hypothesis.

Ann and Mary were normal, first-born daughters of middle-class English parents whose mothers volunteered to participate in a study on the development of intention. In connection with that study, video and audio tapes were made in the home at 2–3-week intervals from the time the babies were 0;3 until they were 1;0. Starting at about 1;6, audio tapes were made at approximately 6-week intervals. The transcription of some of these tapes provided the basis for the analysis presented here. Tapes made when Ann was 12, 29, 49, 79 and 87 weeks old, and when Mary was 13, 22, 29, 38, 44, 52, 75 and 81 weeks old have been analysed for the relevant mothers' speech features. Each tape contains 20 consecutive minutes, including a feeding session and the immediately preceding or following play session.

The number of maternal utterances and the amount of time devoted to feeding and play in each session are presented in Table 1. The mean length of utterance (MLU) calculated in words for each session is presented in Fig. 1, along with the MLUs of the 10 longest utterances (MLU10L) per session. The MLU and MLU10L values found in other mothers' speech studies are also presented in Fig. 1 as points to indicate approximately what values might be expected at later ages and to show that very similar values were found in the only other available study of the pre-verbal period (Bingham 1971). It is striking that the MLU, the most-used index of syntactic complexity, showed almost no change over the 15-month period. The mothers' speech to Ann and Mary at 0;3 was as simple as at 1;6. All the MLU values fall well within the range found in the other studies.

Though Ann's mother's longest utterances were as short at 0;3 as at 1;6, Mary's mother's MLU10L was quite high until Mary's first birthday. She produced a small proportion of relatively long utterances, which were faster and lower pitched than most of her utterances and which gave the impression that she was 'talking to herself out loud'. These had disappeared by 1;6. This small proportion of utterances not directed at the child at the earlier ages may be what Phillips (1973) was tapping with her finding of greater variability in various mothers' speech features at 0;8.

Fig. 2 shows the frequency of interrogative forms in the speech of Ann's and

TABLE 1. *Amount of time spent and number of maternal utterances produced in the feeding and play portions of the sessions analysed*

	Ann					Mary							
Age in weeks ...	12	29	49	79	87	13	22	29	38	44	52	75	81
Minutes of feeding	17·50	8·50	3·50	10·00	5·50	9·10	10·50	12·20	15·40	9·00	5·45	7·40	10·00
Minutes of play	3·45	13·00	16·20	10·00	14·10	12·20	10·30	9·10	5·40	12·30	15·45	12·20	10·00
Utterances, feeding	133	66	23	139	90	45	80	56	127	65	53	123	109
Utterances, play	100	150	231	130	280	157	149	112	69	148	235	276	198
Utterances, total	233	216	254	269	370	202	229	168	196	213	288	399	307

Mary's mothers, with reference points taken from relevant mothers' speech studies. Interrogative forms were defined as utterances with S–V inversion, containing a tag, and/or having question intonation; in this way a surface structure definition was adhered to, not a pragmatic one. The frequency of interrogatives – at 1 ; 6 about as high in these mothers as in the other mothers studied – actually declined between 0 ; 3 and 1 ; 0, rising again somewhat by 1 ; 6. It is thus clearly not the case that these mothers started producing interrogatives with high frequency at the time that they started expecting verbal responses or comprehension of speech from their daughters. The data from the mothers Bingham studied, presented as triangles in Fig. 2, also indicate a very high frequency of questions to very young babies.

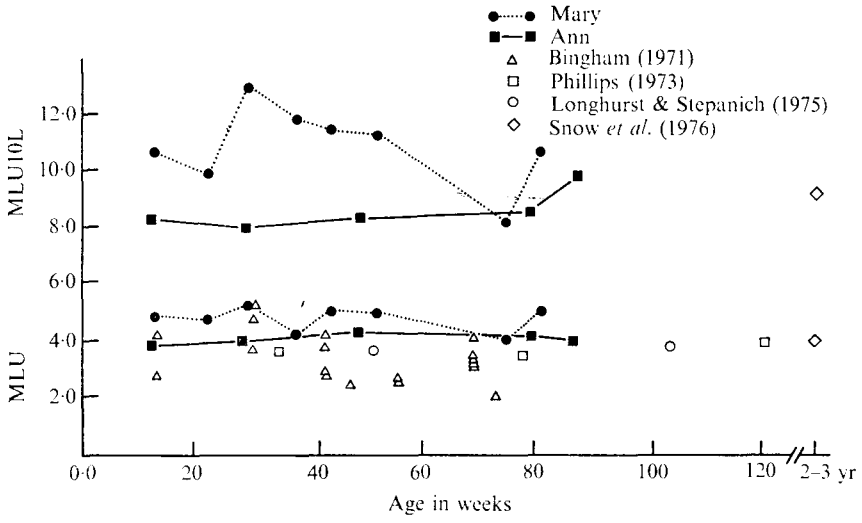

Fig. 1. MLU and MLU10L calculated for the speech of Ann's and Mary's mothers when the children were 0; 3–1; 6. MLU and MLU10L values from other studies are presented as open points. The points derived from Bingham (1971) represent single subjects; the other points represent averages of 10–12 subjects.

Data from MLU and interrogatives have been discussed in some detail because these are two oft-cited characteristics of the mothers' speech register for which considerable data were also available from other studies. Other measures calculated for Ann and Mary include the percentage of declaratives, of imperatives, of 'contentless' utterances (utterances consisting of verses, songs, sound-play, imitations of the babies' babbles, etc.), and the temporal reference of the mothers' utterances (see Tables 2 and 3). For these measures, as for MLU and interrogatives, there is no indication whatsoever that the characteristics of the mothers' speech change abruptly at 0 ; 10 to 1 ; 2, in response to the children's growing linguistic abilities. Changes which did occur started about 0 ; 7, if not

earlier. This suggests strongly that explanations of the mothers' speech register purely as a response to cues of attention and comprehension from the child have been simplistic and incorrect. Another explanation must be sought for why mothers' speech is the way it is.

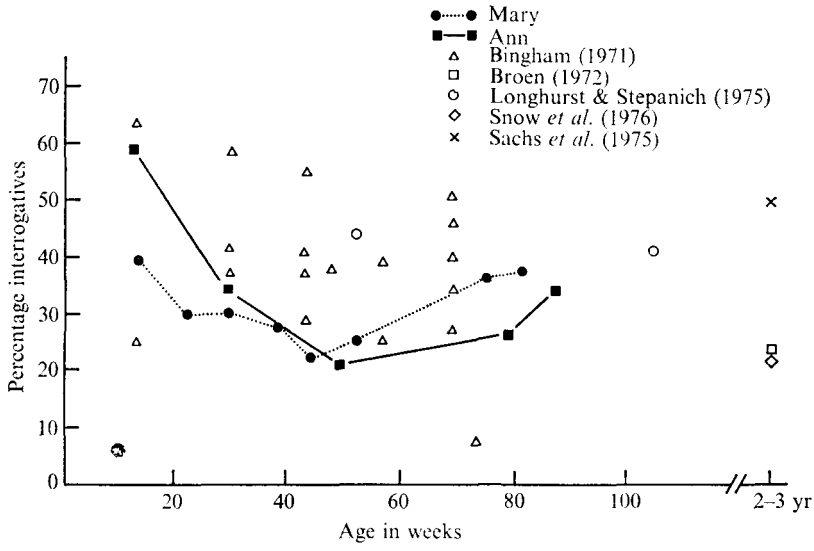

Fig. 2. Percentage of maternal utterances to Ann and Mary which were interrogatives when the children were 0; 3–1; 6. The points represent values found for percentage of interrogatives in other studies. The points derived from Bingham (1971) are based on individual subjects; the other points represent averages of 12 subjects.

The speech of Ann's and Mary's mothers did change strikingly between 0 ; 3 and 1 ; 6 in terms of what they were talking about. If each maternal utterance (except the contentless utterances and exhortations like *come on*) is classified in terms of whether it refers to the child, to the mother, to entities or actions in the world, or to combinations of these, then a steady decline is seen in the references to the child alone, and a steady increase in utterances containing references to the world (see Fig. 3). At the earliest age, the mothers were talking a great deal about the children's feelings and experiences (their being tired, hungry, bored, what they were looking at, etc.), and at later ages about their activities and about objects and events in the immediate environment. The mothers were attuning their speech to their children's growing interest in objects and activities outside themselves, and their need for information about those objects and activities. This attunement began, however, well before the children could realistically be said to have needed it or to have been actively eliciting it. The change started by 0 ; 5 for Mary and by 0 ; 7 for Ann. Thus for this measure of the maternal speech, like the others, one must reject the hypothesis that the characteristics of

TABLE 2. *Percentage of maternal utterances classified as Imperatives, Declaratives, and Contentless*

Type of utterance		Age in weeks 12–13	22	29	38	44	49–52	75	79–81	87
Imperatives	Ann	9·5	—	6·2	—	—	24·9	—	22·8	9·2
	Mary	15·0	18·7	6·9	24·7	28·8	28·0	15·6	5·3	—
Declaratives	Ann	9·1	—	22·0	—	—	28·8	—	34·8	34·1
	Mary	19·2	24·4	31·2	17·9	29·3	28·7	23·5	38·3	—
Contentless	Ann	21·6	—	37·8	—	—	25·7	—	16·1	23·0
	Mary	26·4	27·1	31·9	30·0	19·7	17·7	25·2	16·7	—

TABLE 3. *Percentage of maternal utterances referring to present, immediate past, immediate future, remote past, and remote future events*

Temporal reference		Age in weeks 12–13	22	29	38	49–52	75	79
Present	Ann	80·5	—	58·7	—	51·3	—	70·7
	Mary	75·7	64·1	—	59·5	60·8	75·4	—
Immediate past	Ann	3·5	—	33·6	—	23·5	—	7·1
	Mary	8·1	5·1	—	7·1	7·2	3·9	—
Immediate future	Ann	16·0	—	3·8	—	25·2	—	20·7
	Mary	13·1	25·6	—	32·1	31·2	29·3	—
Remote past	Ann	0·0	—	0·0	—	0·0	—	0·0
	Mary	1·0	3·4	—	0·0	0·8	1·3	—
Remote future	Ann	0·0	—	3·8	—	0·0	—	1·4
	Mary	2·0	1·7	—	1·2	0·0	0·0	—

the mothers' speech register appear as responses to the child's need for or attempts to elicit appropriately simplified, redundant, and semantically relevant speech.

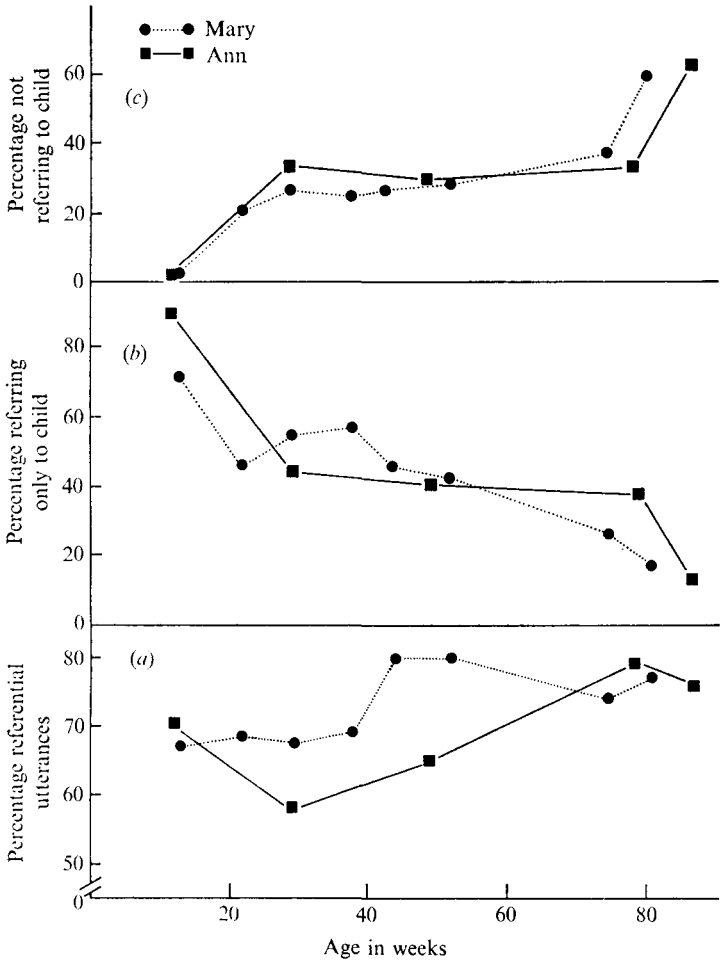

Fig. 3. (*a*) Percentage of maternal utterances which were referential. (*b*) Decline with age in the percentage of referential utterances that referred only to the child. (*c*) Steady increase with age in the percentage of referential utterances which did not refer to the child at all.

CONVERSATIONAL MODEL

What, then, is the explanation for these adjustments in the mothers' speech? And what changes occur in the mother–infant interaction at 5–7 months which could explain the changes in mothers' speech style which take place then?

TABLE 4. *Frequency of speaker-switching and mean length of maternal and child turns for Ann and Mary at* 0 ; 3, 0 ; 7, 1 ; 0 *and* 1 ; 6

Age	0 ; 3		0 ; 7		1 ; 0		1 ; 6	
	Ann	Mary	Ann	Mary	Ann	Mary	Ann	Mary
Frequency of speaker-switching	18	24	56	30	70	72	222	226
Mean length of maternal turns in utterances	23·50	15·54	7·45	10·50	7·06	7·78	2·42	2·98
Mean length of child turns in unit-types	1·00	1·00	1·04	1·07	1·03	1·00	1·19	1·08

Answering these questions requires looking more specifically at the functional aspects of the maternal utterances, and especially at the nature of the interaction the mothers were engaging in with their babies. I would suggest that the interactions between these mothers and babies can best be described as conversational in nature, and that the changes in the maternal speech result from the development of the baby's ability to take her turns in the conversation. In order to support this contention, I will cite some examples of interactional sequences that occurred between Ann and her mother (similar sequences from the transcripts of Mary and her mother could also be quoted) and analyse them using the conversational model presented by Sacks, Schegloff & Jefferson (1974).

The hypothesis that the mothers were using a conversational model in interacting with their children rests on two crucial assumptions: that they were trying to communicate specific information to the babies, and that they were receiving (or trying to receive) specific information from them. The conversational mode differs from other communicational modes precisely in that it is RECIPROCAL – information is exchanged between the partners in both directions. It is thus of special interest that the mothers would choose this reciprocal system for interacting with babies still so young that their ability to communicate was very limited. If the mothers' only purpose was to keep the babies quiet and contented or attentive by talking to them, then they could have chosen any of several other modes of interaction – telling stories, singing songs, reciting poems, talking nonsense, thinking aloud. In fact, the mothers made almost no use of a monologue mode; even when they did sing songs or recite nursery rhymes they did so as part of a game in which the baby also played a role, e.g. the Ride-a-cock-horse game described by Bruner (1975). Essentially, all of the mothers' speech was related in content to the baby or the baby's activities and direction of attention, and much of it was directed towards eliciting responses from the baby. It is for these reasons that it seems appropriate to describe the mothers as operating within the conversational mode in interacting with their babies.

Sacks *et al.* (1974) proposed a two-part system for the organization of turn-taking in conversation: a TURN-CONSTRUCTIONAL component, which produces the unit types which make up a speaker's turn; and a TURN-ALLOCATIONAL component, which operates through a set of rules to determine who will speak next. The turn-allocational component operates only at transition-relevant places, which are determined by the end of the unit-type selected by the current speaker. Unit-types may be words, phrases or clauses – they are, in fact, equivalent to the units traditionally called utterances. The end of an utterance is a transition-relevant place, i.e. a place where a new speaker may be selected or may select himself, or where the current speaker may continue with another unit-type. The most common technique for self-selection as the next speaker is by starting to talk first. The means by which the current speaker selects the next speaker include the 'adjacency-pairs', i.e. utterances which by their nature demand a reply from

a specific person, such as a question addressed specifically, a compliment, an insult, or a greeting. The rules proposed by Sacks *et al.* are designed to account for turn-taking in multi-participant conversations. The mother–child interactions studied here were simpler, in that only two potential participants were present. They also differed in that, whereas getting one's turn is a major goal in adult conversations (Sacks *et al.* suggest that it is a motivation to go on listening carefully), getting the child to take her turn seemed to be the primary goal of the mothers studied. None the less, much of the mechanism suggested by Sacks *et al.*, especially the notion of speaker-selection by the use of adjacency-pairs, seems very useful in describing the mother–infant interactions discussed here and in accounting for many of the characteristics of the mothers' speech.

Three months

Before discussing the evidence supporting the conversational interpretation of mothers' speech to young babies, it is perhaps instructive to cite an example of a very typical exchange at 0 ; 3 :

(1)	Mother	Ann
		(smiles)
	Oh what a nice little smile!	
	Yes, isn't that nice?	
	There.	
	There's a nice little smile.	(burps)
	What a nice wind as well!	
	Yes, that's better, isn't it?	
	Yes.	
	Yes.	(vocalizes)
	Yes!	
	There's a nice noise.	

This sequence demonstrates several points. First of all, it gives an example of the short, simple, baby-centred utterances typical of the mothers' speech at this time. Secondly, it includes three cases of specific maternal responses to infant behaviours. These are typical of many more instances; at 0 ; 3, in fact, 100% of both Ann's and Mary's burps, yawns, sneezes, coughs, coo-vocalizations, smiles and laughs were responded to by maternal vocalizations, suggesting that under conditions of reasonable proximity such responses were almost obligatory for these mothers. Thirdly, it exemplifies the nature of maternal responses to the class of infant behaviours in question: the behaviour is referred to specifically, either by naming, as above, or by using a relatively stereotyped content-related response, such as *That's better* or *Pardon you* to a burp, and *What's so funny?* or *Do you think that's nice?* to a smile. Such specific, content-related and predictable responses on the mothers' part have been taken as the criterion for referring to

infant behaviours as unit-types within the Sacksian model, i.e. as the units which constitute a turn. Using this criterion of maternal responsiveness, it is possible to identify a fairly restricted class of infant behaviours which at 0 ; 3 qualify as unit-types: smiles, laughs, burps, yawns, sneezes, coughs, coo-vocalizations, and looking attentively at something. These behaviours do not satisfy the normal adult criterion for a unit-type, that it be intentional and communicative. However, they do all have in common that they are directly interpretable, i.e. that they can be responded to as if they were intended to communicate something specific. Infant behaviours which do not have this quality of signalling something unambiguous about the infant's state of mind, e.g. arm- or leg-waving, bouncing, head-movements, or crying, do not seem to function as infant unit-types in conversational interactions.

Responding, even responding consistently and reliably, to this class of infant unit-types does not provide the basis for very extensive turn-taking, partly because the babies did not emit such behaviours very often. The mothers devoted a much greater proportion of their utterances to trying to elicit specific responses, most often coos or smiles, from the babies. That these utterances had the very specific function for the mother of trying to elicit turns from the baby, thus justifying our referring to them as first-pair parts of adjacency pairs, is evidenced by the fact that the topic of the maternal utterances was shifted as soon as the elicitation was successful. Ann's mother at 0 ; 3 devoted 124 consecutive utterances to the topic of burping, and shifted to the topic of what Ann was looking at as soon as Ann had indeed burped. The adjacency-pair nature of these turn sequences is, of course, apparent only to the mother. It is she who is imposing on the interaction the rules of conversation, of which her baby is still unaware (though it has been suggested that babies of this age are capable of elementary turn-taking; Bateson 1971, Jaffe, Stern & Perry 1973). The mothers' attempts to maintain a conversation despite the inadequacies of their conversational partners account for the most striking characteristics of the maternal speech style – its repetitiveness, the high frequency of questions (especially tag-questions and post-completers like *Hmm?*, which are described by Sacks *et al.* (1974) as devices for passing a turn on), and the frequency of sequences like (2) and (3), in which the mother takes both parts:

(2) Mother
Oh you are a funny little one, aren't you, hmm?
Aren't you a funny little one?
Yes.

(3) Mother
Where is it? (referring to the baby's wind)
Come on, come on, come on.
You haven't got any.
I don't believe you.

The mother here repaired the breakdown in the conversational exchange by filling in for the baby, taking the turn for her. A further conversation-repair device used by the mothers at 0 ; 3 consisted of phrasing questions so that a minimal response on the baby's part could be treated as a reply. In (4) the mother shifted topics as if the baby had said she was finished, whereas all she had in fact done was refrain from crying when the bottle was removed.

(4) Mother
Are you finished?
Yes? (removing bottle)
Well, was that nice?

This sequence also exemplifies one of the most ubiquitous features of the mothers' speech at even the earliest age studied: the mothers constantly talked about the child's wishes, needs and intentions. A crying baby was always offered specific comforts, as if the mother's task was to find out something the baby already knew. Persistent crying was referred to as 'being stroppy', as if it reflected intentional naughtiness. The babies' behaviour was never described as random, and only rarely as a function of physiological variables. It was seen, just as adult behaviour is seen, as intended and intentional. This view of infant behaviour is of course prerequisite to the attempts to communicate with the baby, and to interpret the baby's behaviour as communicative, which have been described above. The presumption that any voluntary behaviour is produced intentionally is also common in interaction between adults. Austin (1962) gives the example of sentences (5*a–d*), in which the same event is described but with different levels of intention ascribed to the actor:

(5*a*) John pulled the trigger.
(5*b*) John shot at the donkey.
(5*c*) John hit the donkey.
(5*d*) John killed the donkey.

The tendency to report intentions and consequences instead of actual behaviour is thus not peculiar to mother–infant interaction; it is simply more striking there because non-voluntary behaviours such as burps are also interpreted as intentional and because the basis for assigning intention is so often unclear to the observer.

The mothers talked very little to the babies during bottle feeding while the bottle was in the mouth at 0 ; 3 (see Table 1). Maternal utterances during the feeding sessions were restricted to the winding episodes, unless the baby did something special which elicited a response, such as ceasing to suck (eliciting *What's the matter?* or *Have you had enough?*) or staring at something in the room (eliciting *What are you looking at?* or *What can you see?*). The lack of maternal utterances during bottle feeding supports the contention that the mothers' speech was produced on the basis of a turn-taking model. The mother's aim was

to engage in adult-style conversation with true turns, and she therefore refrained from talking when the baby was prevented from answering. A similar pattern emerged during spoon feeding, when maternal utterances were produced between spoonfuls, not when the baby's mouth was full.

Interestingly, crying on the part of the baby did not seem to act as the first half of an adjacency-pair in the same way as burping, smiling, laughing, etc. The mothers did, of course, respond to crying, but they did not respond in specific and predictable ways, perhaps because crying gives too little information about what the appropriate response would be.

Seven months

The most striking change between 0 ; 3 and 0 ; 7 was that the babies were at 0 ; 7 considerably more active partners. This is reflected in the figures given in Table 4, which show that the mean length of a maternal turn (i.e. the mean number of maternal unit-types which followed one another without intervention of a baby unit-type) declined drastically between 0 ; 3 and 0 ; 7, and that the frequency of speaker-switching increased concomitantly. The increased participation of the infant in the interaction occurred despite the facts that the baby's repertoire of unit-types had only expanded slightly, and that the mothers had become somewhat more demanding as to what kinds of vocalization they accepted as a unit-type.

At 0 ; 7 the baby could initiate an adjacency-pair by smiling, laughing or burping, as at 0 ; 3, and also by producing a kind of protest cry. This cry was observed when, for example, Ann's mother persisted in offering a spoonful of food which Ann had already refused, and when Ann's mother restrained her from moving out of camera range. It was more discrete than the crying at 0 ; 3, and had much more the character of a signal which the mother had to respond to, e.g.

(6)	Mother	Ann
		(protest cry)
	Hey hey hey hey hey	(protest cry)
	Hey come on, lookit, look shh. There.	(looks at mother)

The mother no longer responded to all child vocalizations, only to 'high-quality' vocalizations, i.e. a vocalic or consonantal babble. These high-quality babbles were quite frequent and did elicit sure responses, often in the form of imitations. Elaborated and lengthy babbling sequences were responded to with *What was that all about?* or *Oh, really?* Responses to the baby's babbles accounted for 7·2% of Ann's and 4·4% of Mary's mother's utterances at 0 ; 7. The turn-taking character of babble-imitations is made especially clear in the transcript from Ann and her mother, because Ann's mother had introduced an imitation

game, in which she set rules about the nature of the correct response. This is illustrated in (7):

(7)	Mother	Ann
	Ghhhhh ghhhhh ghhhhhh ghhhhhh	
	Grrrrr grrrrrr grrrrrr grrrrr	(protest cry)
	Oh, you don't feel like it, do you?	*aaaaa aaaaa aaaaa*
	No, I wasn't making that noise.	
	I wasn't going aaaaa aaaaa.	*aaaaa aaaaa*
	Yes, that's right.	

This imitation game was, in principle, symmetrical, with either partner privileged to imitate the other. In fact, as the quoted exchange indicates, Ann often failed to observe the rules, and her mother carried much of the structure of the game.

The babies had at 0 ; 7 a somewhat larger repertoire of motor responses which could be recruited into the turn-sequences. Taking a bite of food was accepted by Ann's mother as a response to *Isn't it nice?*; looking about or reaching for an object as a response to *What's that?* or *Where's it gone?*; and looking at the mother as a response to the child's name. In example (8) Ann's mother refers to the object as *it* in her third utterance, as if Ann had named it, whereas all Ann had in fact done was to establish joint reference by looking at the object:

(8)	Mother	Ann
	Look, what's that?	
	What's that?	(looks at object)
	Well you thought it'd gone away, didn't you?	

Despite the fact that the children were more active in taking their turns at 0 ; 7 than at 0 ; 3, they still very often failed to do so. Occurrences of maternal questions without answers (9), and of such conversational repairs as mothers answering their own questions (10) and simplifying their own questions (11) were still frequent.

(9)	Mother	Ann
		(looks into corner of room)
	What can you see?	
	What are you looking at?	
	What are you looking at?	
	What are you looking at, hmm?	
	Hmmm?	*haaa*
	Haaa	

(10) *Mmmm, does that taste nice?*
I don't suppose it does, does it?
Doesn't taste very nice.
No, it doesn't.

(11)

Mother	Ann
Where's it gone?	
Where's it gone, little one?	
Where's it gone?	
Hey?	
Where's it gone?	
's gone away, hasn't it?	
Hmm, has it gone away?	(looks at mother)
Yes, it has.	

Twelve months

The turn-taking activities at 1;0 did not differ greatly from those at 0;7, although in general the babies were both responding more reliably to maternal utterances and were initiating more adjacency-pairs with their own activities. The nature of the mothers' responses to the infant vocalizations had changed. Rather than simply producing imitations of the high-quality babbles, the mothers now sometimes expanded or explained the babble, implicitly accepting it as an attempt at a word:

(12)

Mother	Ann
	abaabaa
Baba.	
Yes, that's you, what you are.	

Hiding and finding objects had become a favourite game for Ann, one which ideally allows symmetrical turn-taking, but which was initiated only by the mother at this stage:

(13)

Mother	Ann
(rattling container) *What's in there?*	
What's in there?	(drops object out)
There it is.	

(14) (dropping object into container) *Inside.*
(looks into container) *There it is.*

The following sequence was initiated by Ann, but she failed to take her second turn, so her mother had to answer her own question:

(15)

Mother	Ann
	(straining to get out of mother's arms)
Oh, where do you want to go then?	
Hey!	
Where do you want to go?	
Where do you want to go?	
You want to go exploring.	

Although the turn-taking activities did not change greatly in nature between 0 ; 7 and 1 ; 0, the number of and amount of time spent in shared activities increased steadily from 0 ; 3 till 1 ; 0. At 0 ; 3 Ann and her mother had only two short periods of shared social activity – an episode of mutual looking, and the protoconversational sequence partially quoted above. By 1 ; 0 they shared several different kinds of activities, some of which extended over several minutes, e.g. their imitation game, hiding and finding an object, retrieving an object from inaccessible places, and looking at Ann in a shiny surface.

Eighteen months

By the time she was 1 ; 6, Ann was taking her turn quite often and most of her unit-types consisted of words. Her mother expected not only that she would take her turn, but that she would provide appropriate responses, e.g.

(16)	Mother	Ann
	Who's that?	*Daddy.*
	That's not daddy, that's Dougall.	
	Say Dougall.	
(17)		*Hot.*
	Hot, hot.	*Tea.*
	No, it's not tea, it's coffee.	*Coffee.*
	? (incomprehensible utterance)	*Coffee.*
	You're not having coffee now, you're having dinner.	

Such sequences of response, correction, and corrected response, which occurred for pronunciation corrections as well as content corrections, formed an important part of the turn-taking at 1 ; 6.

Almost any clearly articulated word from Ann seemed to function as the initiator of an adjacency-pair at 1 ; 6, and her mother would even interrupt an ongoing conversation with the observer in order to respond to them. Examples (18) and (19) show how Ann's words initiated new conversational topics:

(18)	Mother	Ann
		(blowing noises)
	That's a bit rude.	*Mouth.*
	Mouth, that's right.	*Face.*
	Face, yes, mouth is in your face.	
	What else have you got in your face?	*Face.* (closing eyes)
	You're making a face, aren't you?	
(19)		
	Don't know where it is. (talking about Ann's nose).	*Titus Titus* (the cat)
	Where, I can't see him.	
	Oh, there he is.	

Oh yes, he's on the floor.
Titus is... *Floor.* (interrupting)
Floor. *Floor.*
Yes, Titus is on the floor.

Even if the mother had nothing to say about the new topic, she never failed to respond by at least repeating the word. This mother's insistence on politeness formulas and her consistency in responding to them provided another turn-taking situation, e.g.

(20)

Mother	Ann
(giving Ann a biscuit) *What do you say?*	
What do you say?	
No, you don't put it straight in your mouth.	
What do you say?	*Thank you.*
There's a good girl.	

and numerous cases of (21):

(21)

Mother	Ann
	Please.
Please what?	

Ann's mother continued to use the question-reformulation technique to make it easier for Ann to take her turn:

(22)

Mother	Ann
What else have you got in your face?	
Where's your nose?	
Where's your nose?	
Ann's nose?	

(23)
Where's Titus?
He went out, didn't he?

However, despite the imperfect turn-taking, the interaction at 1 ; 6 gave the strong impression of being a real conversation, both in terms of the frequency of speaker-switching and in terms of the apparent effectiveness of the communication. This impression was dependent on the mother's willingness to follow up on any conversational opening given by the child, and to fill in for the child whenever necessary. Ann still clearly violated some of the rules of turn-taking – for example, by interrupting a conversation going on between mother and observer, by introducing new topics before current topics were exhausted, and by failing to complete many adjacency-pairs introduced by the mother. The mother very effectively kept the conversation going, despite these inadequacies on the part of her conversational partner, by her constant willingness to cede a turn to the child, to accept any reasonable attempt at a word as a first pair part,

to follow the child's shifts in conversational topic, to fill in for the child when she missed her turn, and to change the form of her own first pair parts until they did elicit a response.

DISCUSSION

The hypothesis that mothers operate on the basis of a conversational model in interacting with their babies helps to explain some of the striking aspects of mother–infant interaction and some otherwise puzzling aspects of the mothers' speech register as well. This hypothesis accounts for the fact that mothers talk to young babies at all, and explains why they talk to them most while in a face-to-face position or sharing activities, and least while feeding. Furthermore, it accounts for the very high frequency of questions in speech to babies: questions, especially tag-questions and other post-completers like *Hmm?*, are devices for passing the turn to the partner, which is precisely what the mothers are trying hardest to do. Another adjacency-pair used by mothers in much the same way is greetings; an analysis is currently under way of the situations in which mothers greet their infants, but preliminary observations confirm that mothers greet infants after only very short absences or separations, situations in which greeting an adult would be quite abnormal. Both questions and greetings enable the mother operating within the conversational mode to treat any response on the part of her child as a communicative response, because the mothers' conversational rules dictate that the unit-types which follow questions or greetings be responses. Very often, of course, the question or greeting was not followed by any behaviour which could be interpreted as communicative, and then the mother was forced into conversational repair procedures such as repetition or taking the baby's turn.

The nature of adults' speech to 2-year-old children can also be better understood if it is recognized that such speech occurs within conversations and is largely directed towards keeping the conversation going (see Cherry 1976, Lieven 1975, Shugar 1975). For example, the mothers studied used turn-passing devices frequently, but never used turn-grabbing or turn-keeping devices (pre-starters such as *Well*... and *But*..., and pause-fillers) which are quite frequent in adult–adult conversation. This fact may help to explain the absence of inappropriate pausing, segmentation ambiguities, and false starts in mothers' speech to 2-year-olds (Broen 1972). Mothers' desire to communicate reciprocally with their children, which underlies their use of the conversational mode, may well be a crucial factor in limiting the topics discussed and thus the semantic and syntactic complexity in mothers' speech. The question-reformulation sequences and similar sequences with imperatives may account for much of the utterance and constituent repetition in mothers' speech to 2-year-olds, as it does in mothers' speech to babies. Furthermore, recognition of the skill and

insistence with which mothers introduce the conversational mode into their interactions with their children may help to explain how children acquire turn-taking skills, both in conversation and in other types of interaction, so early (Escalona 1973, Keenan 1974).

The way mothers talk to their babies is one reflection of their belief that the babies are capable of reciprocal communication. Their choice of the conversational mode not only reflects this belief, but also provides opportunities for reinforcing it by giving meaning within the rules of conversational turn-taking to the infant behaviours that occur. Another example of a similar process is provided by Newson & Pawlby (1974), who report that mothers who had been observed playing imitation games with their babies said that they did so because it gave them the feeling of being in contact with the babies. Maternal expectations about infants' abilities both arise from and are tested by the nature of the interaction mothers establish with their babies. An important question for future research is the extent to which the nature of the interaction established between mothers and infants in the first year of life contributes to the speed and the nature of later language acquisition.

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