

THE RELEVANCE OF MOTHERS' SPEECH
IN COMMUNICATION WITH
THE PRE-VERBAL CHILD.

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ABSTRACT

In this research project, the speech which four mothers used to address their language-learning infants was examined.

Part 1. A Descriptive analysis of mother's speech to infants led to the conclusion that this speech is both simple and redundant in nature, as measured by the language classification tools used. However, the four mothers used in this study differed from each other, in their speech to their infants.

Part 11. A Trend analysis of measures of mother's speech to infants was used, to note how this speech changed over time. Little change was observed within each mother's speech to her infant, over the following periods of time : Oliver's and Julie's mothers, 24 weeks (each), Sarah's mother, 42 weeks and Kerry'n's mother, 56 weeks.

Part 111. A Functional analysis of mother's speech to infants suggests that speech varies in function as the child develops. This is particularly seen in the inclusion of the world about the child by the mother in her speech. The content of the mother's messages also varies over time. Finally an example of trends in 'conversation' between mothers and their infants is presented as another useful approach.

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1.0 INTRODUCTION

'It is now recognized that the speech of caretakers to children is a crucial factor in understanding language acquisition and that language acquisition is a process which begins well before the first two-word utterance, or even the first use of a constant phonological form with constant reference.' (Snow (1976) pg.3)

This brief summary of the work into the development of speech in infants, clearly states the findings of numerous studies to date; and presents the point at which this study began analysing speech to infants.

Workers in this field would generally agree that the verbal stimulation provided by a caretaker (most usually an infant's mother) is important to the infant's development of language. It is therefore important to precisely analyse the linguistic input which an infant receives.

Such information will assist in determining how the mother, by the modification of her ordinary speech provides an input to her infant, which in turn assists its language acquisition. It is assumed here that the acquisition processes within the child require the experience of language, under conditions yet to be specified, for their emergence.

It is the concern of this study to discover precisely what samples of language are presented by the

mother to her infant. Also the concern here is with when, in the course of the child's development, these samples are presented and how they change over time.

The variety of views and hypothesis which have led to the above recognition of the importance of an analysis of mother's speech, are presented in the following review.

2.0 LITERATURE REVIEW.

2.1. EARLY RESEARCH INTO THE ACQUISITION OF LANGUAGE.

'Language is so much a part of our everyday life and so characteristically the prerogative of man, that for a long time the nature, and the somewhat surprising speed of the process by which the human infant acquires speech, attracted little scientific curiosity'. (Oldfield and Marshall (1973) pg.14).

Paula Menyuk (1971) notes that the phenomenon of Language Acquisition has engaged man's interest for many centuries. Oldfield and Marshall (1973) suggest that the invention of the telephone and telegraph gave impetus to the formal study of language. In extending the distance and speed of communications whilst depriving the speaker and hearer of non-linguistic cues, these tools focussed attention on the nature of linguistic operations, as did the research aimed at improving them. Hence the interest in mathematical studies of communication and the construction of theories of linguistic processes, which were based on the contingency of word strings. Following such an interest, Chomsky's linguistic theory was formulated. Of the many early theorists in this field, only Chomsky's work is discussed, as it has most influenced developmental psycholinguistics.

2.1.1. Chomsky's outline of language acquisition.

Chomsky suggested that language had unique productive features with a complex system of rules, which defy a simplistic interpretation. Chomsky's explanation of the acquisition of these features of Language introduced an innate component. This innate ability of speakers of the language, established the task of the linguist as the analysis of the rules of Language and their emergence.

Chomsky (1970) makes the useful observation that the familiarity of the phenomenon of Language is a major problem in its study. One tends to take for granted that Language is acquired by habits, connections and training. For Chomsky however, the rules and principles which govern the system are what need analysis. However determining the system of rules has not led to an understanding of Language in use.

Chomsky's bias towards the syntactic and structural features of Language led to an exclusion of many other aspects of communication. Nevertheless, the Chomskian analysis of written sentences of language, as distinct from language in use, tended to dominate empirical research for some time.

The impact of this theory was in its offering more insight into speech and language than any previous view. Also it provided fresh ideas and concepts suitable for experimental research. A further contribution to the

study of Language by Chomsky was to refute the Behaviouristic view of acquisition.

van der Geest, Gerstel, Appel and Tervoort (1972) note the distinction between a linguistic theory of language and a psycholinguistic description of the phenomena in reality. They note limitations in Chomsky's notions of competence and performance and describe these definitions as 'too naive for any use beyond linguistics' (van der Geest et al (1972) pg.12). These authors introduce into their analysis of language the context and situation in which an utterance occurs as a major part in understanding its meaning and use. van der Geest et al (1972) acknowledge Bloom's (1973) approach which also makes use of contextual cues to classify the speech studied.

2.1.2. Post-Chomskian views.

In his (1972) paper Slobin presents new directions in the field of language study at that time. Slobin emphasises the Cognitive abilities of the child, in asking what a child pays attention to, how this is understood and how meanings are organised. The child's meanings in its speech are also examined in terms of Bloom's earlier rich interpretation (i.e. as a simpler form of adult speech)(1). Parental speech as an issue is only briefly mentioned. Some psychological influences and constraints on language

(1) Bloom (1970) cited in Slobin (1972)

acquisition are suggested. There has been a sudden broadening in the approach to this field since Slobin's writing.

Lois Bloom's (1973) contribution to the study of language has been in her use of the Semantic features of speech. Bloom sets out to explain the transition by children from one word utterances to syntactic speech. Her explanation is as follows. Children, in acquiring language, learn a code for the conceptualizations of their experiences prior to language. Thus in the first two years of life, a child perceives and organises his experiences of the world in terms of non-linguistic conceptual representations. Words or words in syntax map or code these representations. It is not therefore adult parts of speech which are learned but rather a code for the child's own conceptual notions of recurring experiences. This argument supports that of Sinclair-de-Zwart (1969, 1973) in her presentation of a Piagetian approach to Language. Although in her approach Bloom does not expose herself to Howe's (1976) criticism, in her analysis of children's speech she seems to draw more from adult speech meanings than from the child's cognitive capacity.

Christine Howe (1976) notes that the meaning and use of two word utterances is inaccurately analysed by workers e.g., Bloom, Brown, Schlesinger and Slobin. Howe suggests that a child's cognitive structure is

not the same as an adult's and it is therefore an error to view a child's use of one or two word utterances in terms of adult utterance meaning.

The inclusion of semantic features of language to syntactic analysis has been central to most post-Chomskian work. However, although it is children's speech which is examined in many such studies, it is usually analysed as a simplified form of adult speech. Hence the relevance of Howe's (1976) criticism.

An interesting feature of Brown's (1973b) and Bloom's (1973) work is that it forms a transition between a syntactic analysis and a functional analysis of speech. Brown criticises the Chomskian approach as being concerned with:

'pure syntax, in abstraction from semantics, with no real attention paid to what the children might intend to communicate.' (Brown (1973b) pg.290).

Thus Bloom appears pre-occupied in studying children's speech, with 'semantic intentions', while Brown focusses on the classification of a child's speech as messages. (2).

Joanna Ryan (1973) comments that the 'innate' component of earlier language studies contain: 'a very narrow characterisation of what it is that is acquired....during language development' (pg.429).

(2) This is empirically presented in A First Language : Brown (1973a)

Added to this, the rules which are sought for language development are: 'viewed in almost total isolation from any other aspects of language'. (Ryan (1973) pg.429). As will be noted later, seeing language as implying an intention to communicate is a recent trend in theory.

Ryan's point is extended in Bruner's comment that although much has been done to enrich our understanding of early language :

'to write a grammar of that language at any point in its development is in no sense to explicate the nature of its acquisition'. (Bruner (1974) pg.256).

For Bruner the child's task in Language acquisition goes far beyond the acquisition of rules or simple skills (3).

2.2 THE CONCEPT OF THE SPEECH ACT.

Dissatisfaction with a purely structural method of analysis (be it syntactic or semantic) led to the identification and inclusion of other features of speech as phenomena for research.

Macnamara's (1972) paper is an early introduction to the use of the concept of Intention and its relationship to meaning. Macnamara sees the infants' task in acquiring language as:

(3) This approach is outlined in a simpler form in Bruner (1976).

'first determining, independent of language, the meaning which a speaker intends to convey to them.' (Macnamara (1972) pg.1.)

Thus Macnamara focusses on the comprehension of speech rather than its production. The meaning of an utterance is further examined in terms of a linguistic code. The child's ability to understand speech is constrained by the child's cognitive structures. However, the problem of analysing 'independently attained meaning' unless in the sense of primitive object recognition, is not fully explained.

2.2.1. Criticisms of the Syntactic approach by Dore.

Dore's analysis first proposed in his (1972) paper and elaborated in his (1974) and (1975) papers and more empirically in Dore, Franklin, Miller and Ramer (1976) will be presented here. This view places an emphasis on Searle's (1970) concept of the 'Speech Act'.

It is of interest to note that Head in 1926 (cited in Oldfield and Marshall (1973)) anticipated this approach when he suggested the use of a quantitative test of Language functioning, to compare different individuals' speech or the same individuals' speech at different times. This clinical suggestion originally for the analysis of speech disorders, has taken nearly fifty years to be usefully incorporated

into the study of Language.

Dore (1975) criticises the syntactic approach to early language thus:

'The word sentence presupposes a certain grammatical structure which is wanting in the child's utterance.' (pg.22). He continues to suggest the use of the Speech Act concept to broaden the limited structural approach.

Searle (1970) following Austin's (1962) work states that:

'the production of the sentence taken under certain conditions is the illocutionary act and the illocutionary act is the minimal unit of linguistic communication.' (Searle : 1970 'g.39). An illocutionary act also has a force. For example:

"Is it hot today?" Here the illocutionary act, the spoken message may contain the force of an intention to elicit a reply from the hearer. Other more subtle forces may be present e.g., the utterance may be a code, a pass-word, etc. The point here is that the interpretation of the utterance is not dependent on formal grammar, but on the intended effect on the hearer by a speaker.

Searle also adds to speech analysis the notion of rules (that is of speech being rule-governed). His assumption here is that a speaker intends to have a certain effect on his listener by the use of linguistic

rules or conventions. Dore (1974) sums up this idea in:

'The performance of speech acts is a matter of the speaker's intentions being expressed according to the conventions of his language.' (pg.344). And, further,

'to communicate that he wants something requires a relatively clear intention.' (Dore (1972) pg.624). (of what he wants of the other).

Following Searle, Dore proposes an utterance has a propositional content, which conveys the basic message; and a functional device which indicates to the hearer how the proposition is to be understood.

This approach may be reduced to the following features:

- (a) that understanding an utterance implies knowing its meaning;
- (b) that the meaning of an utterance is conveyed in rule-governed behaviour; and
- (c) that the intention to convey a meaning is in its being uttered; whilst the intention and hence meaning is recognised by a hearer, who uses his knowledge of the rules for the expression of such utterances to interpret them.

Dore (1975) states his task as answering the question:

'how does the child acquire the linguistic conventions necessary to express his intentions? In other words, how do speech acts develop?' (pg.30).

The advantage of this approach is that it solves four problems of earlier work which as Dore notes are implied in Bloom's (1973) work, i.e:

- (a) that no direct evidence for an innate component for syntax has emerged, yet on the other hand, there is still no explanation of how syntax could be learned;
- (b) Bloom's claim that a child's intonations accompanying one word utterances lack linguistic structure has been contradicted by later work; e.g. in Kaplan (1969) and also in Menyuk and Berholtz (1969) - both cited in Dore (1975);
- (c) the problem of what is the most accurate representation of the child's knowledge? (As the child seems to understand more than he produces); and, finally,
- (d) how should children's speech be interpreted? i.e., is it syntactic, semantic or conceptual. (Here Howe's comments on the necessity for an incorporation of the child's cognitive processes into an analysis of speech is important).

Dore (1974 etc) adds to the Speech Act concept the notion of a Primitive Speech Act. This functions as a description of children's utterances in the one-word stage and is defined as

'not merely an elliptical adult speech act, but a qualitatively different entity which possesses only some features similar to full speech acts'.
(Dore (1975) pg.32).

Contextual cues are used to interpret the child's intentions. This avoids the difficulty of attributing too little linguistic significance to the non-linguistic features of speech.

Dore feels that the transitional stage from Primitive (one-word) Speech Acts, to Speech Acts (two word or longer utterances), is the key part of his work.

The main features of this approach assert a close relationship between meaning and intention and the idea that one communicates by getting a hearer to recognise one's intention to communicate.

For Dore, the analysis of Speech Acts in distinguishing pragmatic intentions from grammatical structures, provides a more adequate base for describing all the features of speech.

Problems emerge when one looks at different kinds of Speech Act effects and their relationship to meaning. Also the difficulty of one's meaning something and the possibility that what one actually says may vary in meaning, depending on the words one uses, is not fully solved.

The Speech Act concept has been incorporated into this project. However, it has been

extended even further back in time as a Pre-Speech Act. This is a communicative act (a sound or a gesture) which does not fall into the category of speech, but which shares some characteristics of a primitive or full speech act in being intentional and concerned with conveying a message. Intention is used in a broader sense than in Dore's use.

2.2.2. Bruner's incorporation of the Speech Act.

Another proposer of a Speech Act framework for language analysis is Jerome Bruner.

Bruner (1974) points out a limitation of the Chomskian approach. By overemphasising a depth of insight into the formal nature of language, the approach loses an essential breadth of perspective. That is, although much has been learned of the structure of language, the important functional aspects have been overlooked.

Bruner's use of Searle's (1970) Speech Act concept is similar to Dore's (in the works previously discussed). i.e., both theorists suggest that the purpose of Language is communication. An additional approach used by Bruner (1974) is Grice's (1968) theory of meaning. The vital question to ask is, according to Grice:

'What, so to speak, has to be added to the noises that come out of my mouth in order that their production should be a performance of the act of asking a question, or making a statement, or giving an order etc?'

(quoted in Bruner (1974) pg.276).

Bruner (1975) adds to the Speech Act analysis the notion of joint action between the mother and her child; during these period Bruner feels the child's behaviour is aimed towards:

'mastery of (the)"utterer's meaning".....
(which) provides the child with a conceptual structure that is also embodied in the language he is to learn.'
(Bruner (1975) pg.6).

This joint action assists the child in grasping the rules and structures inherent to communication. Bruner (1975) states:

'play has the effect of drawing the child's attention to communication itself and to the structure of the acts in which communication is taking place.'
(pg.10).

Hence the task involved in the examination of Mother-child pairs is the tracing of precursors of such rule orientated behaviour. At the same time one will note the emergence of Communicative Acts which become more refined as linguistic and cognitive processes develop. It will be possible (it is suggested) to observe from an early age (long before the acquisition of speech) the intention to communicate in the child during joint activities with its mother.

2.2.3. The Importance of the Child's Cognitive capacity.

An important issue in Language research is Cromer's "cognition hypothesis", quoted by Bruner (1975) and discussed in Cromer (1974). This view has two aspects:

- (a) that a child only understands and uses linguistic rules when its cognitive ability enables it to do so; and
- (b) that although a child may use a rule, this does not necessarily mean that it has grasped the complexity of the rule, nor that it has totally integrated it into its own communicative system.

Cromer elaborates this system to include 'the cognitive, the semantic, the pragmatic and the purely grammatical' levels of analysis in speech (from Lewin (1975) pg.109). This hypothesis is a useful reminder of the constraints of Cognition on Language.

In (e.g. Dore's and Bruner's) works much is inferred from the child's behaviour and the context in which messages occur. For example, Bruner (1976) presents most of his empirical data as a behavioural and contextual analysis. One can only infer however, that an intention to send a message is present in a child, as one knows that the child is developing towards the system of Speech Acts and communication, which constitutes adult speech.

2.2.4. Conclusion.

Here an attempt has been made, to trace the development of the Research Hypothesis of this project and to place it in the context of recent work in the field of Psycholinguistics.

To sum the approach, I note once more the 'initial optimism' (Bruner's term) of the people working with and after Chomsky. Chomsky's views, although providing heuristically valuable to research, have been found insufficient for the study of the ontogenesis of child communication.

Later work focussed on the semantic aspects of children's speech to determine how, in the light of adult speech, language was acquired. Hence the work of Brown (in Brown 1973a and b) with Bellugi (1964), Bloom (1973) and Slobin (1972).

But recently Bruner (1974) suggested that:

'neither the syntactic nor the semantic approach to language acquisition take sufficiently into account what the child is trying to do by communicating.' (pg. 283).

By noting the philosophical linguistic analysis of Searle (1970) and Grice (1968) Dore and Bruner both incorporated the concept of the Speech Act and emphasised the importance of a Functional analysis of speech.

'A speech act approach.....is adopted in order to consider language in relationship to behaviour generally and to allow for an emphasis on the use of language rather than on its form,' (Bruner (1975) pg.1.)

This functional analysis adds to a description of the nature of Language as Speech in use and its acquisition.

2.3. THE INTRODUCTION OF A BROADER SOCIAL VIEW OF DEVELOPMENTAL STUDIES.

A salient point on the study of Language Acquisition is that in mastering a language a child must acquire:

'a complex set of broadly transferrable or generative skills - perceptual, motor, conceptual, social and linguistic - which when appropriately co-ordinated yield linguistic performances that can be described.' (Bruner (1974) pg. 256).

2.3.1. The Social View of Interaction.

The need for a more embracing view of development has also been recognized by Social theorists. For example, Schotter (1974) sees the child as an interacting system, aware of and responsible for its own action. Hence the simple cause and effect analysis of a physical science fails and a broader system is suggested as necessary for a fuller analysis of human behaviour.

Richards (1974b) adds to this point by highlighting the Biological and Social aspects of man. Here a Piagetian approach is also incorporated and the consequences of an infant's actions are examined in terms of the infant's structural developments, due to interactions with the world.

Bowlby's theory of attachment as presented in his (1971 and 1975) works, is cited by Richards

in his book The Integration of a Child into a Social World (1974a) as being the major guiding framework for research into the social development of the infant. Bowlby's earlier work (1974 first published in 1953) focussed specifically on the growth of the attachment relationship between a mother and her child and the influence of this relationship on the child's development. This has been broadened to consider the growth of social behaviour itself without restricting the analysis to the mother alone. Richards (1974a) notes that the social environment needs to be linked to the biological nature of the infant, for a complete description of the developmental process.

Richards (1974c) presents an analysis of communication in an infant's first year, noting the importance of the auditory and visual systems which the infant possesses. For example, the visual system allows face-to-face and eye-to-eye contact to develop with the mother. Once again the complex nature of communication is noted.

'I regard communication as something beyond interaction; it is not simply a two-sided modification of behaviour or responsiveness to signals, but involves notions of mutuality, reciprocity and intersubjectivity.' (Richards (1974c) pg. 123).

An empirical example of this work is Trevarthen's (1974) paper. Working with Richards and Bruner,

Trevarthen filmed and analysed infants' behaviour from a few weeks of age. Infants were found to be adaptive in their behaviour from about three weeks i.e., they approached people in a different way to approaching objects. Trevarthen (1975) concludes:

'that infants of a few weeks of age were showing signs of intentions to speak and that soon after this they were entering into well-organised, sometimes even witty, or humourous, conversation-like exchanges with adults'.

Trevarthen suggests an elaborate social response from infants by two to three months of age. A note on the dangers of over-interpretation may be useful here, for example Start's (1976) amusing but observant paper : Is Politeness Innate?'

Caution is necessary too in overemphasising the need for a detailed description of behaviour. For example Stern's (1974) examination of social behaviour tends to produce a clinical and artificial view of Mother-Infant interaction. Here the subtle elements of interaction may be lost when the mother's and infant's behaviour is analysed too minutely.

Thus, the focus of more recent social studies tends to be on interactions, while the study of individual elements is seen as least fruitful. In constructing explanations of human behaviour, Lewis and Lee Painter (1974) note that the more complex an interaction, the more complex will be the picture

yielded. Thus instead of isolating a phenomenon more information should be added to it to form an explanation of its occurrence.

A further view incorporating the total situation in which behaviour occurs is Schaffer (1968) and in his book The Growth of Sociability (4). Schaffer notes the importance of examining:

- (a) aspects in the environment which are influential to shaping the child's behaviour (the task of the present project); and
- (b) understanding the manner in which a child responds to and retains the influence of such forces.

Socialisation studies also suggest a complex interaction between environmental and constitutional forces. That is, the interaction between a child and its environment is not a one-way but a two-way process and is not a simple, but a multi-faceted form of behaviour.

This may be noted in Richard Bell's (1975) statement that:

'an undirectional approach is too unprecise,' (pg. 365).

Using the authors already mentioned, Bell combines the view of the active infant and of the two-way nature of mother and infant interaction.

(4) Shcaffer's views are also briefly expounded in Lewis (1975).

This view is also held by Moss (1975) who goes on to suggest that maternal behaviour is to a large extent, under the control of stimulus and reinforcing conditions from the infant. Moss' point is that the infant effects the quantity and quality of maternal behaviour by adding an important dimension to interaction.

Empirically this approach necessitates an in-depth analysis of behaviour. For example, Brazelton Koslowski and Main's (1974) focus on the origins of reciprocity illustrates the fine analysis necessary to examine the subtle and complex phenomena of early interaction between a mother and her infant. Numerous other studies exist which attempt this in-depth analysis of early infant behaviour; for example Korner's work (in Lewis and Rosenblum (1974) and elsewhere). Numerous books present the social orientation discussed here, with detailed studies on various aspects of behaviour, e.g. Lewis and Rosenblum (1974), Martin Richards (1974c) and Lewin (1975) to name but three.

It is unnecessary to the topic of this work, to discuss, in detail, the host of theorists who suggest a broader perspective in the analysis of behaviour and the nature of Mother-Infant interactions as a dual process. Their work, however, must be noted in the analysis of Communication.

This view adds to the Speech Act approach, firstly in broadening the possible influences on language and acquisition and, by making one aware of the possible range of behaviours important to speech (as previously noted in Bruner (1975)). Secondly, by noting the importance of contextual and 'real life' studies rather than the more artificial analysis of an isolated written system.

2.3.2. The incorporation of social views into studies of language acquisition.

The above approach is present in Psych-linguistic theory. For example, a stress on Environmental influences in Language acquisition is the basic issue of Moerk's (1972) paper. Moerk notes that language discourse should be described as embedded into the general stream of behaviour. Many other aspects of the situation (apart from the verbal exchange), need to be taken into consideration when analysing the interaction between a mother and her infant. For example, the objects in the behavioural setting alone may have a significant influence on the play which occurs.

In his (1974) paper, Moerk notes the child's linguistic capacity as influencing the interaction between the mother and her infant. These changes, Moerk suggests, are due mainly to the increasing language skills of the child.

Susan Ervin Tripp (1973a) and (1973b) pre-states Bruner's view by suggesting that environmental circumstances, cognitive factors, information storage and environmental input to the child are all important features of language acquisition.

Shugar (1972) states the case for including an account of the total activity during speech in language studies. Here the flow of behaviour is examined to determine elements which change during the course of a communicative interaction.

Presenting a cognitive emphasis Sinclair-de-Zwart's (1969) and (1973) papers outline the use of Piaget's theory of cognitive structures in dealing with language acquisition. However, Bruner (1974) criticises Piaget's approach for concentrating almost exclusively on the formal aspect of language, at the expense of the functional aspects, lacking reference to the uses to which language is put in different contexts. On the other hand, Bruner does note with reservations, the usefulness of de-Zwart's suggestions.

Newson and Newson (1975) demonstrate the value of Piaget's views in their analysis of Intersubjectivity, by incorporating Piaget's approach within a Social framework. The infant's knowledge of objects is presented as an important Cognitive base for language. However, it is the early experience to which the infant is exposed in terms of reciprocal

activity with its caretaker which aids the development of cognitive competence and finally linguistic competence. Although this view has been suggested by others, e.g., Cromer (1974), few theorists have empirically tackled this problem.

2.3.3. Conclusion.

Here theories suggesting a wider variety of features important to language acquisition were presented. This view includes the broadest range of behaviours and experiences influencing linguistic development. Also, a method referring to and using the functional, contextually bound aspects of speech is discussed.

2.4. THE ANALYSIS OF MOTHERS' SPEECH.

2.4.1. The Early view of the role of mothers' speech in language development.

'The supposed linguistic poverty and unhelpfulness of the environment has been emphasised on the basis of no data at all; as will be argued below this insistence belittles the complexity and richness of much mother-infant interaction.' (Ryan (1973) pg. 428).

Thus Joanna Ryan introduces her case against the Chomskian view of language acquisition. (5) As Ryan (1973) points out earlier views held that children

(5) A simplified version of her argument is in Lewis (1975).

could not learn speech from the complex and fragmented sample to which they were exposed by adults. Thus it was suggested that the child's capacity to learn language is innate. But the linguistic environment of the language-learning child has only been analysed very recently. Here the carefully modified and simplified speech of mothers to their children which was found, suggests that the innate explanation of language acquisition is inadequate.

To support the case for more emphasis on the child's language environment, Ryan uses Brown and Bellugi's (1974) paper. This paper presents mothers' speech as formed in sentences which are short, simple and perfectly grammatical. These authors feel that the language-learning child is exposed to speech which:

'comes in the form of a simplified, repetitive and idealized dialect.' (Brown and Bellugi (1964) pg. 136).

They also suggest that mothers' speech, concentrates on reductions and expansions of messages to the child.

Apart from this somewhat informal analysis of mothers' speech, few other studies examined the phenomenon. However later workers began to focus empirically on the linguistic environment of the child.

2.4.2. The Social analysis of Mothers' Speech in interaction.

Early analysis of Mothers' speech examined the influence of socialisation on speech used in terms of class differences and other variables, e.g., Tulkin and Kagan's (1972) analysis of social class differences in Mother-Child interaction. Here it was found that beliefs which mothers held governed their interaction with their infants and that these beliefs differed across classes. This study was followed by Jones and McMillan's (1973) test of Bernstein's theory of class constraints on language. Some support was obtained for the view that class differences are important to language development, as a source of variance. Tizard, Cooperman, Joseph and Tizard (1972) examined the social influence of speech to institutionalised children. Their results suggest little change in the verbal environment of institutionalised children as compared to other children. However, their comparison is largely intuitive.

2.4.3. The Empirical analysis of Mothers' speech to infants.

None of the above studies used clear measures or methods to examine and assess speech to children and many of their observances are almost anecdotal. Neither to the above authors cite Drach, Kobashigawa Pfuderer and Slobin's (1969) early empirical

examination and measurement of Mothers' speech to infants. Drach et al's (1969) collection of papers are the main reference on mothers' speech in all later work.

In analysing a sample of speech addressed to an adult and an infant, Drach (1969) found differences in all the measures of language used. His final conclusion was that the mother's speech to:

'the child consisted of short, complete, grammatical utterances, while that (speech) directed to the adult was long, rambling, complex, rapid and frequently interrupted by false starts and hesitations.' (Drach (1969) pg.18).

Pfuderer (1968) from her study of mothers' speech concludes that there is:

'a process through which the adult changes his style of speech to the child which can be partially characterised by the increasing amount of "extra" semantic information.' (Pfuderer (1968) pg. 18 in Drach et al (1969)).

However, these studies do emphasize the fact that they are pilot projects working in an unexplored field.

2.4.4. Later Empirical work on Mothers' speech.

During the past eight years, many workers refined the description of the linguistic environment of the language learning child. Much of the work has been simultaneous with little or no reference to other workers. Thus Vorster (1975) notes that in most studies a description of the linguistic environment, as yet unanalysed is claimed. However, Vorster notes:

'It so happens that most of the authors who wrote these introductory paragraphs seem to do so more or less simultaneously.' (Vorster (1975) pg. 294) (To date the linguistic environment has been fairly extensively analysed).

The interest of researchers in the phenomenon of Mothers' speech has been outlined. Recent findings will now be discussed. Sachs, Brown and Salerno (1972) state that a child does not acquire language by either memorising sentences nor by merely imitating adult speech. These authors suggest that too much interest in the "innate properties" of language has yielded a lack of interest in the character of the linguistic input to children.

Recent studies set out to challenge earlier views, such as McNeill's (1966) statement that the

speech of adults to children is a :

'random, haphazard sample, in no way contrived to instruct a child on grammar'. (McNeill (1966) pg.173).

And Bever, Fodor and Weksel's (1965) work which argues that:

'there is little evidence that adults engage in a careful limitation of their linguistic output when conversing with children.' (Bever et al (1965) pg. 470).

The assumption that a child acquires language independent of the type of speech it receives has been seriously challenged.

Two basic hypothesis formed to test the above ideas are outlined by Phillips (1970a and b) as:

1) 'Adults do not speak to children as they speak to other adults; instead they use much simpler, syntax and restricted vocabulary'

and

2) 'the speech addressed to a child becomes more adult-like as the child increases in linguistic competence'.

(Phillips (1970a and b) pg. 2).

Because of the rapid increase of work in this field, it is useful to group studies into different kinds of material analysed.

Here, much of Vorster's (1974) review of the field is presented. Vorster's is the most comprehensive summary of the work done to date. He suggests that a classification of types of studies is useful, in terms of the data they yield. This is done as follows:

1. Comparisons of adult-adult speech with adult-child speech;
2. Comparisons of adult-child speech X with adult-child speech Y.
3. Comparison of child-child speech X with child-child speech Y.
4. Comparison of family A with family B for total linguistic data and 'input'.

Note : X and Y and A and B in the above indicate that one sample of speech is being compared to a different sample of speech from another speaker.

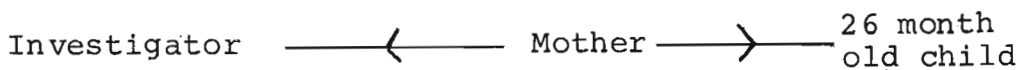
Each of these study types will be presented below.

2.4.4.1. Comparisons of adult to adult and adult to child speech.

As noted by Vorster (1974) this is the most straight forward comparison and one which most studies have attempted. The aim here is to demonstrate the difference between the kind of language used to a child and the kind of language used amongst adult members of society. The simplest comparison

is of a sample of an adult speech to an adult (A-A speech) and a sample of the same adult's speech addressed to an infant (A-C speech) e.g., Drach's (1969) study.

Diagram 1. Drach's (1969) Comparison of Adult speech to Adult and Adult speech to Children.



The figural representation of studies used throughout are from Vorster (1974). It should be noted that:

- (a) In all diagrams arrows point from the speaker to the addressee;
- (b) A line is compared with another line (not one end of the line to the other).

Thus is the above an Adult's speech to an Adult is compared to an Adult's speech to a child.

The major difference between authors is in the variety of ways into which the corpus of speech is segmented, as well as in the variety of measures used to analyse the speech.

One measure of speech used almost throughout the research is that of Mean Utterance length. From as early as 1925 Nice (quoted in Phillips (1970a)) suggested the applicability of this measure as an indication of language development. Usually a large difference in the length of utterance occurs,

depending on the age of the addressee. Other reliable measures used are the rate of speech and the lexical variability used by the speaker. As Vorster (1974) notes:

'The former is a simple syllable (or word count per time unit) while the latter is obtained by dividing the number of words in the sample which are spelled differently (types) by the total number of words (tokens) the result being the so-called type-token ratio (TTR).' (Vorster (1974) pg.17).

One method used to determine the syntactic complexity of language used an analysis of the transformations required to progress from base strings of sentences, to the surface structure of the sentence itself. This approach was modified and used by Brown and Hanlon (1970) (cited in Vorster) being originally outlined by Pfuderer (1968) and Drach (1969), and Vorster (1974) notes some problems of this method namely, that:

- (a) Linguistic and Psychological complexities are suggested but these are difficult to separate;
- (b) a full transformational grammar is necessary before such an analysis is successful. This transitional grammar still has to be developed; and
- (c) in speech the idealized sentences of transformational grammar are never used.

Attempts at this type of analysis may include rather subjective categorization procedures. Here it is important to note the lack of reliability studies by any of the authors who use such a system.

Other studies have extended and varied Drach's (1969) pilot work, e.g., those of Phillips (1970a and 1970b), Broen (1972), Remick (1972), Sachs (1974) and Phillips (1973). The outlines of some of these studies appear below, to show the range of the hypothesis being tested in each case.

Diagram 11. Broen's (1972) Comparison of Adult speech to Adults and Adults' speech to Older and Younger children.

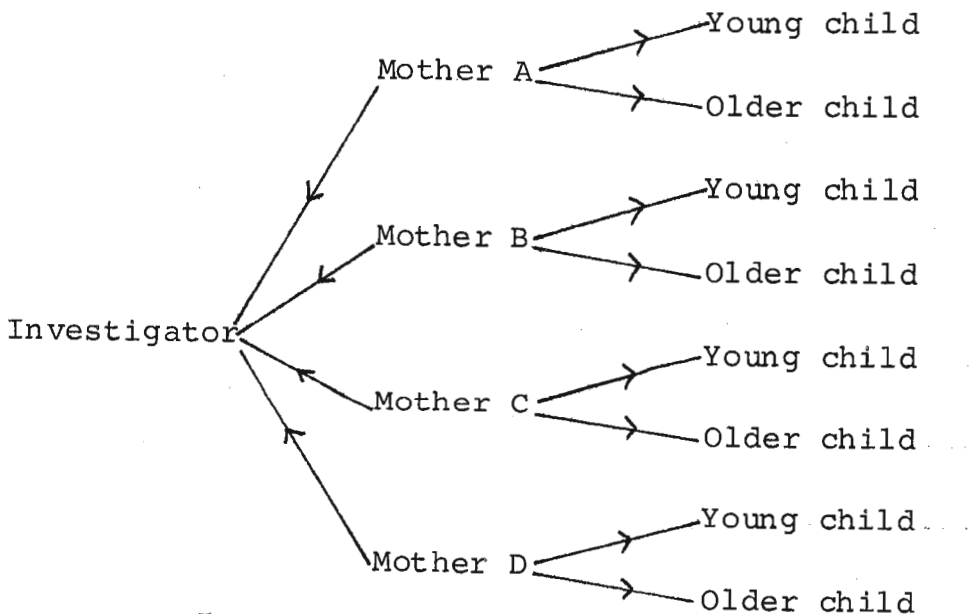


Diagram 111. Remick's (1972) Comparison of Adult speech to Adults and Adults' speech to children.

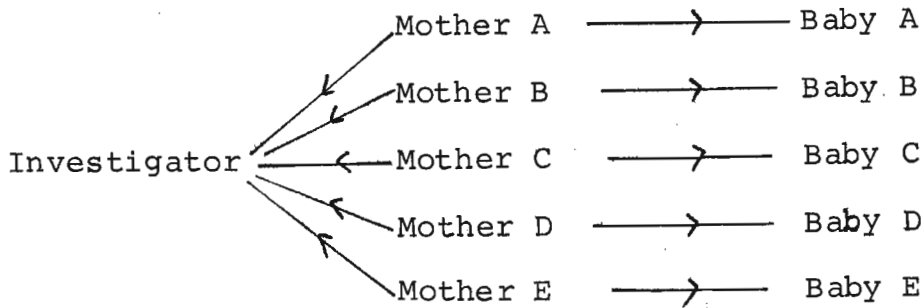
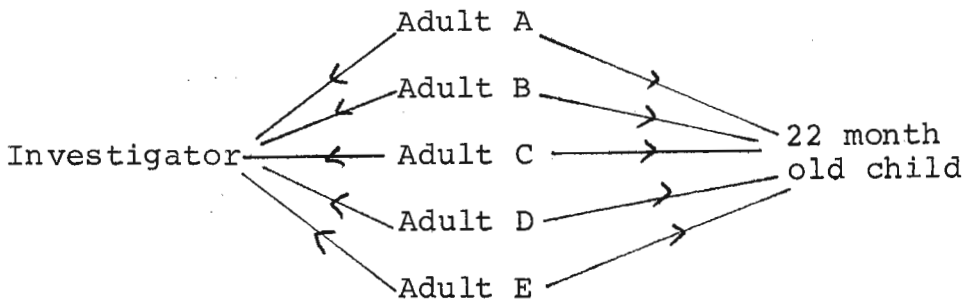


Diagram 1V. Sach's (1974) Comparison of Adult speech to Adults and Adults' speech to children.



N.B. None of the adults here were parents themselves.

Most of the authors overlap in the measures used (See Table 1) and findings tend to consolidate into a single body of evidence. This is due to a sharing of the basic hypothesis.

In outlining the description of Mothers' speech that these authors present, only common measures will be discussed. Speech which is addressed to small children is found to be slower than that which is addressed to adults. Also utterances

addressed to children are usually shorter than those addressed to adults. Measures of syntactic structure e.g., tense, types of phrases, negatives, imperatives, plurals, etc., indicate that Adult speech to Adults and Adults' speech to Children differ significantly. With other measures, e.g., one-word utterances, simple sentences, deletions, fragments of sentences and verbs per sentence, the basic hypothesis that small children hear a special kind of language, which is distinct from Adult to Adult speech, is supported.

Thus Vorster (1974) summarises studies comparing Adult to Adult and Adult to Child speech as follows:

'the A-A and A-C speech of some 45 different adults, tested by five different investigators under a variety of conditions and measured with a wide range of measures, show marked quantitative, grammatical and lexical differences.' (Vorster (1974) pg. 20).

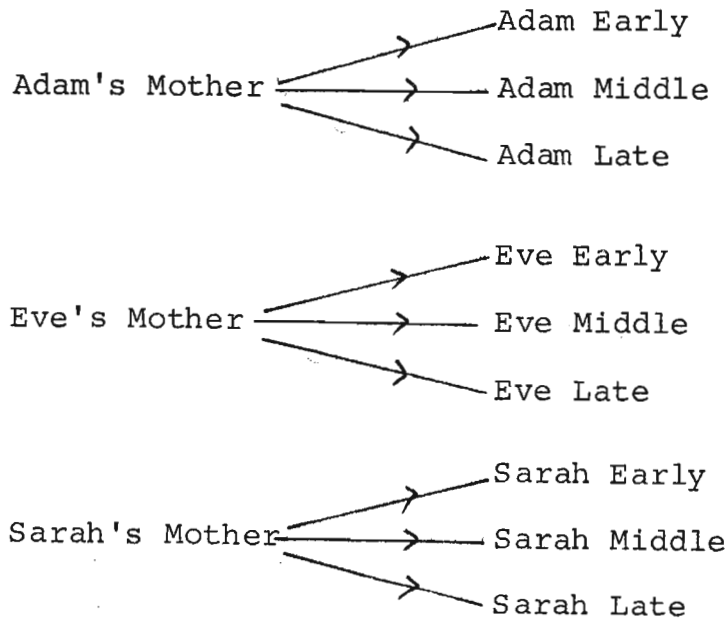
2.4.4.2. Comparisons of Adult to Child speech X and Adult to Child speech Y.

Vorster (1974) notes that the logical progression of the previous hypothesis namely that speech to the language-learning child is modified according to the age of the child, necessitates the isolation of the child's age as a variable. The comparison of

an Adult's speech to differently aged children formed part of both Broen's (1972) and Snow's (1972) study. Both showed, despite the different measures used, that speech directed to a younger child differs significantly from that directed to an older child.

An examination of an Adult's speech to the same child at different ages was done by Pfuderer (1968) as follows:

Diagram V. Pfuderer's (1968) Comparison of Adults' speech to Children at different ages.



Note: Here an Adult to Adult speech comparison was not presented, but was intuitively held to be similar in nature.

Once more, the data supports the view that speech to 'early' infants is simplest and that this speech becomes progressively more complex.

Phillips (1970a and b) examined the pooled data for three groups of mothers divided into three different child age groups. Phillips found that her expectation that Adult speech presented to children at an earlier age is more simple; was only upheld for her 18 and 28 month group comparison, but not for her 8 and 18 month group comparison. The 8 and 28 month groups were similar whereas the 18 month group was found to be the furthestest from Adult to Adult speech in terms of simplicity. Phillips gives the following explanation: In the 'odd' 18 month group, speech analysed was obtained during the mothers' first adjustment of her speech, to her child's own communication and linguistic needs. As child communication is absent from the youngest group, the mother is unsure of the lowest point or 'floor' to which she should adjust her speech and so her speech is too complex. In the 28 month group the mother's speech has returned to a complex level.

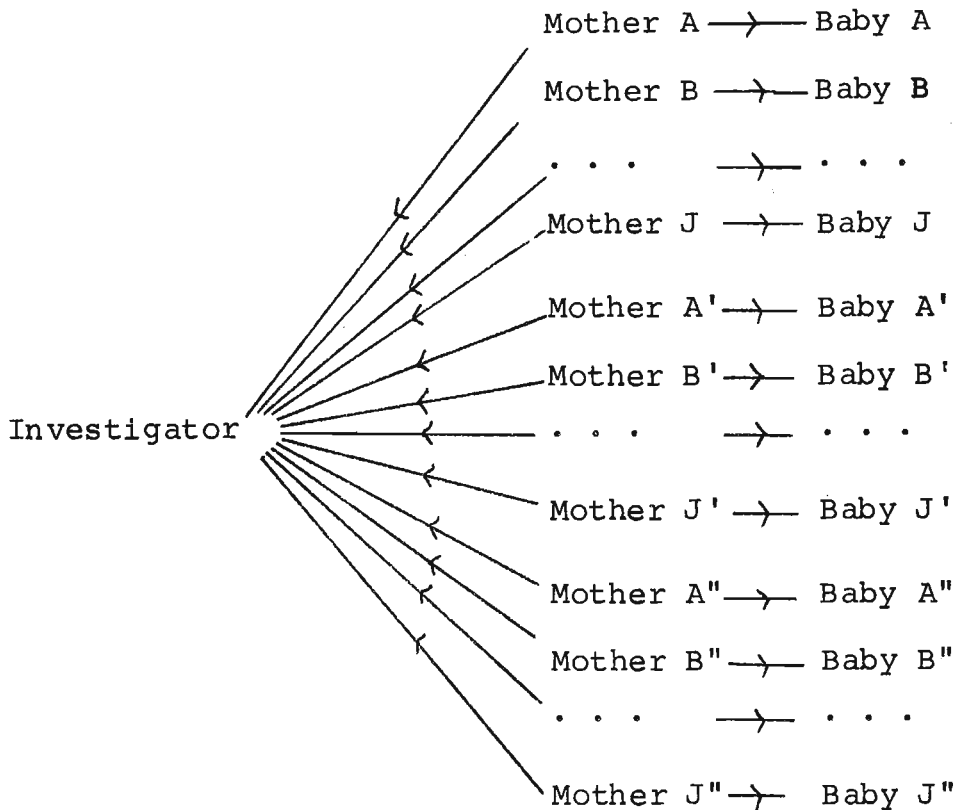
See page 40 for Diagram VI.

Other variables in studies of Mothers' speech have included:

(a) The presence or absence of the child as a cue to the speaker. Here Snow (1972) found that a modification of speech is greater to present children. This supports the hypothesis that cues from the child are important to the adult speaker.

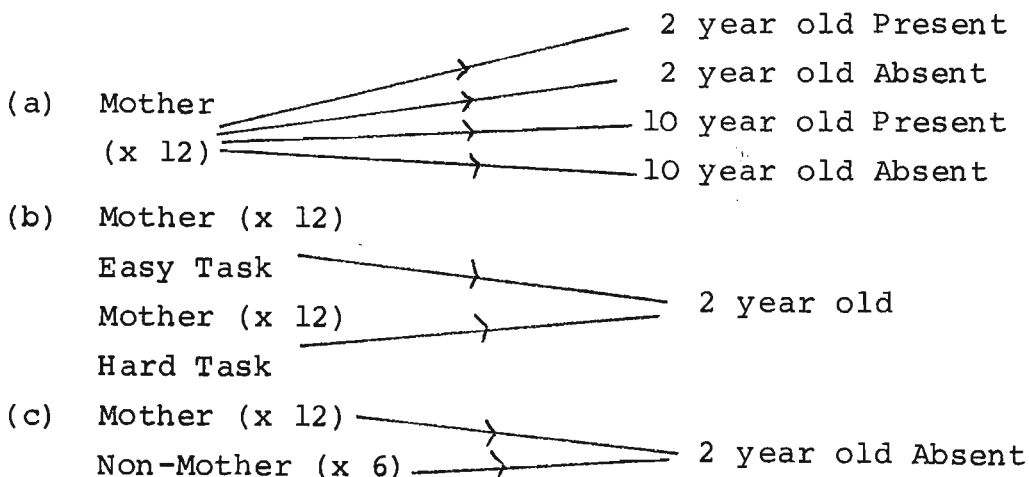
See Diagram VII on page 40.

Diagram VI. Phillips' (1973) Comparison of Adult
to Adult speech and Adult speech to
Children of Different ages.



Note: Babies A, B, ..., J = 8 months; A', B', ..., J' = 18 months and A'', B'', ..., J'' = 28 months.

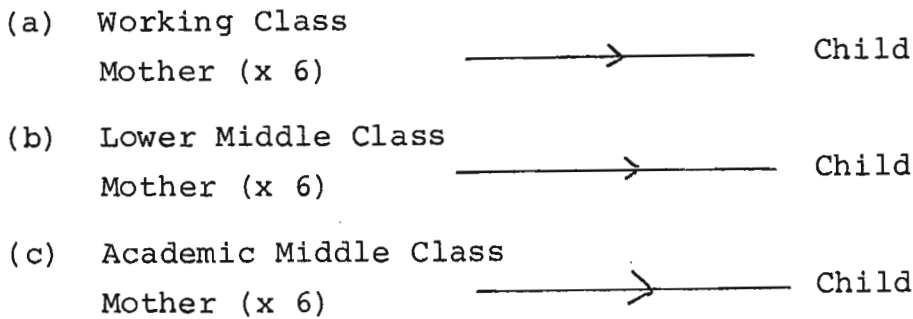
Diagram VII. Snow's (1972) Comparison of Adults' Speech
to Young and Older Children with a present
or absent variable; a task variable and a
mother, non-mother variable.



(b) Whether the speaker is a parent or not; although adult speakers differ in their speech on the whole, experienced mothers are only slightly better than non-mothers at predicting a child's linguistic requirements. This is suggested by Sachs, Brown and Salerno (1972) and Snow (1972).

(c) Social class influences on speech. Snow, Arlmann-Rupp, Hassing, Jobse, Joosten, Vorster (1976) found that little could be predicted about the social class of mothers from their speech to their infants. Thus the social class differences inferred in earlier studies were not upheld.

Diagram Vlll. Snow et al's (1974) Social Class Comparison.



Note: In this study, (a), (b) and (c) were compared.

However, although many studies here examine the child's age as a variable, they are not longitudinal (except for Pfuderer's work). It is suggested in the light of later evidence that changes may be exaggerated by using a sample of children versus a second sample, due to the possible variation of speech from different adults to different

children.

Once again Vorster's (1974) summary is most succinct:

'There is a considerable body of statistically significant evidence that the speech which adults direct at language-learning children does not only differ from the speech which adults use among themselves. Within a broad category of A-C speech there are differences and these differences are dictated by communication between adult and child.' (Vorster (1974) pg.23).

2.4.4.3. Comparisons of Child to Child Speech X and Child to Child Speech Y.

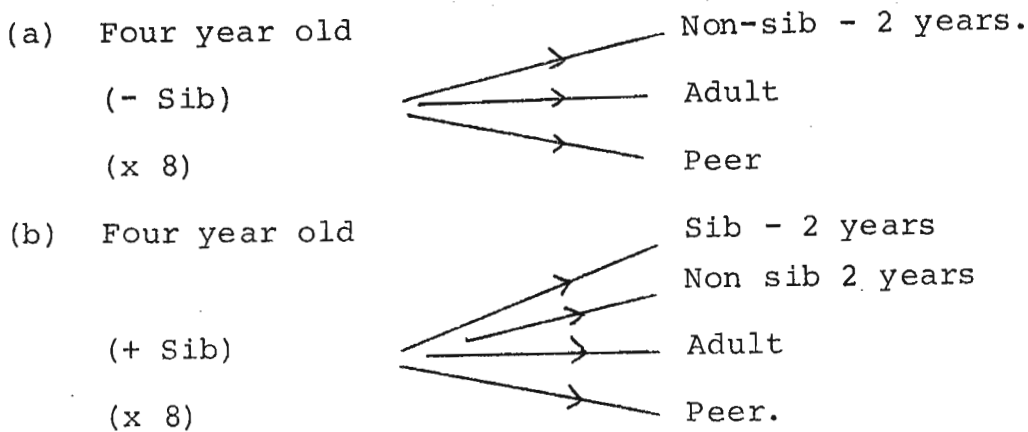
In tracing the language acquisition of a child, other sources of speech to the child have been examined. It is suggested by Schatz and Gelman (1973) and by Sachs and Devin (1973) that the speech of young children to infants also adapts to the younger child's needs.

Using the same analysis as other authors, it appears that shorter, more simple sentences are presented by children to infants, than by children to adults or peers. Also the younger the infant, the greater the adjustment which takes place in child's speech. However, speech to adults and peers despite age differences, is the same.

It seems therefore that anyone speaking to a language-learning child, adjusts their speech to the level required by the child.

Once more support is found for the view that the cues provided by infants are important to the people addressing them.

Diagram 1X. Shatz and Gelman's (1973) Comparison of
Child to Child, Child to Adult and
Child to Peer Speech.



2.4.4.4. Comparison of Family A and Family B for
 Total Linguistic Data and 'Input'

A further issue analysed is the extent to which total linguistic environments differ between homes. The focus here is on the source and quantity of the verbal input to the infant. Friedlander, Jacobs, Davis and Wetstone (1972) confirm that the largest percentage of language stimulation to the child is from its mother (with whom it spends most of its waking hours). However, one child in their sample, rapidly acquired a grasp of Spanish although

this formed only 5% of her total linguistic environment and 37% of all speech directed at her. (5)

Friedlander et al (1972) therefore suggest a re-evaluation of the assumption that mothers' speech, because of its quantity, plays the most decisive part in the child's acquisition of language.

2.4.5. Specialized focus studies on isolated aspects of speech.

Added to the above work are more detailed studies which only examine one aspect of speech. For example, Kobashigawa's (1968) analysis of the frequency and nature of repetitions in mothers' speech; and Holzman's (1972) analysis and classification of interrogative utterances from mothers, to determine their purpose in communication. The latter study is the first to use an approach similar to Dore's and Bruner's (as referred to above) also drawing from the works of both Grice and Searle.

A unique study by Nelson (1973) focussed on the interaction between measures of speech and a variety of environmental influences. The relationships which emerge are hard to interpret. In her

(5) In this study the 'linguistic environment' included all possible sources of speech about the child e.g., speech to others, radio, television etc., giving the figures noted here.

(1974) paper, Nelson goes on to elaborate her functional approach. 'Functional' here, however, applies to the function of objects in the environment before they are labelled; and not to a functional analysis of speech as outlined previously.

2.4.6. Conclusion.

The above authors share a common feature in their research: they contribute some evidence to the view that Adult speech to Children differs from Adult to Adult speech.

The early analysis of Adult to Child speech suggested it to be 'degenerate', abounding in false starts; having a high rate with broken sentences occurring and difficulty in tracing discrete utterances. Vorster (1974) notes (as previously mentioned) that this view held by Chomsky (e.g. 1970), McNeill (1966) and Bever Fordor and Weksel's (1965) analysis of Adult to Child speech were:

'the purest speculative assertion' (Vorster (1974) pg.26).

The data to date, however, agrees with Brown and Bellugi's (1964) suggestion that Adult speech to children is 'simplified, repetitive and idealised'. (pg. 136).

Catherine Snow (1974) notes that three assumptions of language acquisition have been supported by studies of mothers' speech.

- (1) That language acquisition is the result of a process of interaction between a Mother and her Child, which begins early in infancy and to which the child's contribution is as important as the mother's; this interaction is as crucial to Cognitive and Emotional development, as it is to Language Acquisition.
- (2) That Language Acquisition is assisted by and is the result of Cognitive Development;
- (3) That the production of simplified speech registers is one of many communicative skills whose acquisition is as interesting as the acquisition of syntax or phonology.

The indirect influence of the Social theorists in suggesting a broader analysis of language in terms of Socialization Theory, may have led to the testing of the relevance of the Linguistic Environment of the language-learning child. Although the trend away from syntactic approaches was useful, semantic modes of analysing speech do not complete the description. A functional analysis of speech is lacking in the more structural analyses already attempted. The incorporation of Searle's Speech Act concept and the functional nature of speech is important. Although workers have felt the need for such measures, little has been done to empirically incorporate such an approach in the analysis of Speech to Infants, despite for example Snow's (1975) suggestion that one should look at:

TABLE 1 (Contd).

	A	B	C	D	E	F	F ¹	G	H	I	J	(i)
Modifiers	x			x			x		x	x	*	
D - one word sentences					x							*
Incompleteness and deletions	x				x	x	x					
Co and subordination	x	x	x	x		x	x	x	x	x		
Disfluencies					x							
E - Pronominal reference		x				x	x					
Subject identity		x										
Deixis								x				
Sentence functions								x				*
Accessories e.g. tags										x		

(i)

A = Drach (1969); B = Remick (1972); C = Sachs et al (1972)

D = Phillips (1970a and b); E = Broen (1972); F = Snow

(1972); F¹ = Snow et al (1976)*; G = Pfuderer (1968);

H = Shatz and Gelman (1973); I = Vorster (1974); J = this project.

* Note Vorster, being a co-author of this paper was able to use it before it was published.

(ii) When an investigator has made an extensive study of only one aspect, e.g. Kobashigawa (1969) and Holzman (1972) with their papers on repetitions and questions respectively he is not incorporated in this table.

TABLE 2. A Summary of research into Mothers' Speech (From Vorster 1975).

INVESTIGATORS	ADULT ADDRESSEE	SPEAKER	CHILD ADDRESSEE (AND VARIABLE)
Drach (1969)	Drach	1 Mother	1 Age 26 months.
Remick (1972)	Remick	5 Mothers	5 Between 16 and 30 months.
Sachs (1974)	Sachs	5 Non-parents 20-30 years	1 Age 22 months.
Phillips (1970a & b)	Phillips	30 Mothers	30 Age 8, 18 and 28 months.
Broen (1972)	Broen	4 Mothers	2 per Mother:- 18 and + 45 months (age of child)
Pfuderer (1968)		3 Mothers	3 at 3 stages each (age of child)
Shatz and Gelman (1973)	Adults and peers	16 Four-year olds	Two-year old (age of child)
Snow (1972)		24 Mothers and 6 non-Mothers	12 Age 2 and 12 age 10 years (age, task, presence-absence)
Snow (et al) (1976)		18 Mothers from 3 socio-economic classes	18 between 18 and 38 months (socio-economic class and situation)
Snow (1974)		9 Mothers	9 Between 23 and 35 months (age of child)
Vorster (1974)		3 Mothers	3 at 3 ages each : 24-44 months (age of child)
Bakker and Hoefnagel*	Bakker and Hoefnagel	3 Mothers	3 at 27-31 months (different situations)
Garnica *	Garnica	12 Adults, presumably mothers	12 age 2 and 12 age 5 years (age of child)

* cited in Vorster (1975).

3.0 METHOD OF ANALYSIS.

3.1 THE SAMPLE USED:

The corpus of Mothers' speech analysed in this study was drawn from the interaction between four white, middle-class mothers and their infants. The infants ranged in age from birth to two years, forming a longitudinal sample with some overlap between the pairs as follows:

Julie data used: from birth to 23 weeks;

Sarah data used: from 23 weeks to 65 weeks;

Oliver data used: from 69 weeks to 93 weeks; and

Kerryn data used: from 48 weeks to 104 weeks.

(See Plot 1).

No longitudinal pair continued for less than 23 weeks.

3.2. THE METHOD USED:

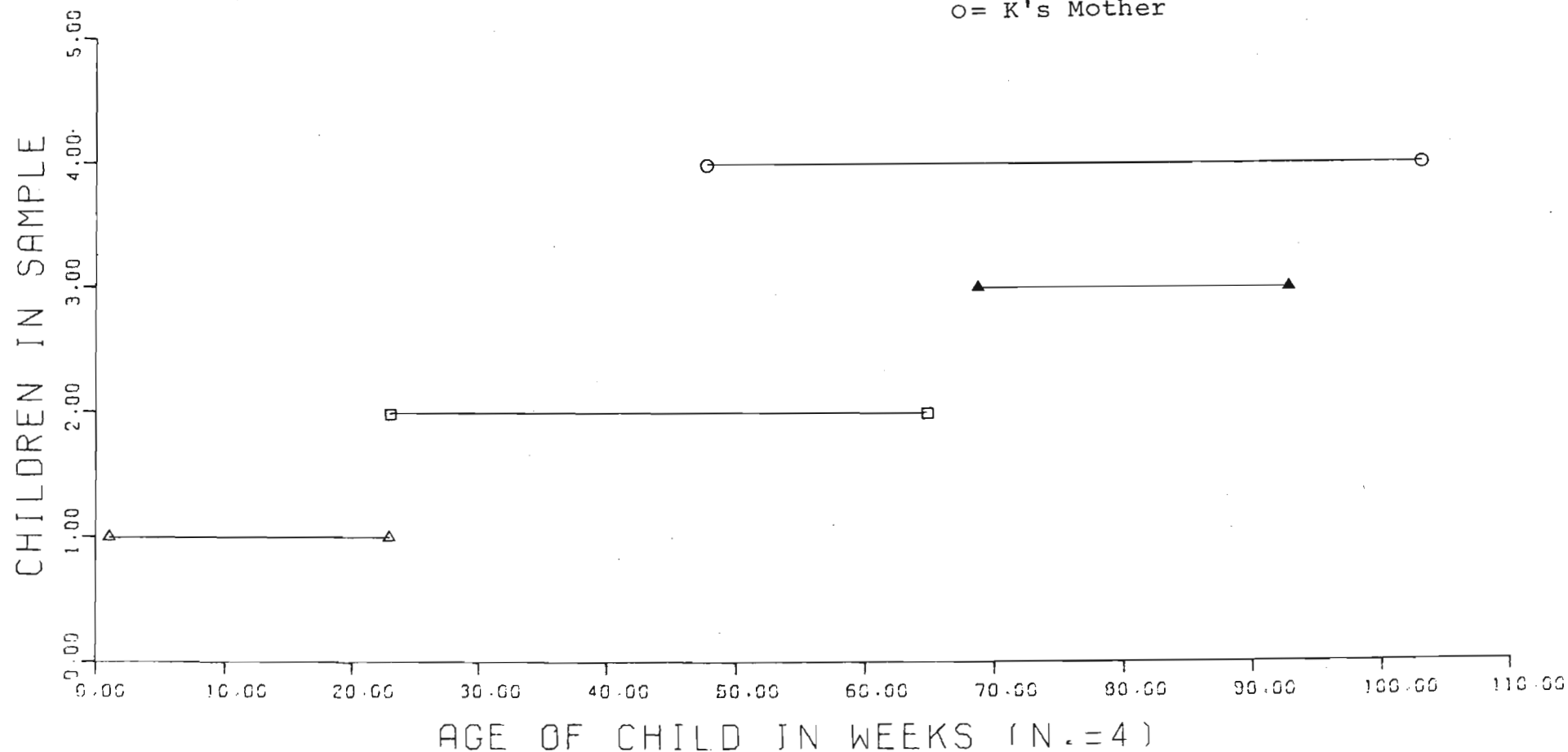
3.2.1. Filming.

The interaction between a mother and her infant was recorded visually and auditorily using a Sony Video-tape recorder. It is of interest to note the recent use of such a method. None of the earlier workers in Mothers speech referred to above, e.g. Phillips (1970a and b, 1973), Remick (1972), Broen (1972), Sachs (1974) or Snow (1972) filmed their subjects. Only recent workers in development e.g. Trevarthan (1974), Bruner (1974, 1975) and Dore (1974, 1975) have employed this highly accurate record of

AGE RANGE OF SAMPLE

PLOT 1.

- △ = J's Mother
- = S's Mother
- ▲ = O's Mother
- = K's Mother



speech in use.

A fairly stable play-room environment was used. The original venue for filming was a room subdivided to provide a small, concealed area for filming (via a one-way mirror) and a larger area, in which the mother and infant being filmed sat and played. The play area was furnished with an armchair, the location of which changed once during filming. The only other objects in the room were wooden fence-barriers for keeping mobile children in the play area. The toys with which the room was provided were from a constant sample - this enabled mothers and infants to develop skills and games with familiar objects.

Later the venue for filming was changed. A larger room was used and a larger camera operating space. This latter venue was still in use at the conclusion of this study.

Although using only one location probably limited the scope of interaction between mother and child (i.e. bathing and eating behaviour were excluded) this did assist comparisons between the Mother-Infant pairs in the sample. Also the environment may have placed a pressure on the mother to play with her child as there was little else for her (the mother) to do in the situation. The youngest infant in the sample (Julie) was filmed in hospital for the first week of her life and then at home for 16 weeks. After this, Julie and her mother were filmed in the

play-room used by the other three Mother-Infant pairs.

Filming was done at as close to two weekly intervals as possible. However this procedure was subject to changes in each mother's private routine.

3.2.1. Recording Mothers' Speech.

All the mothers' speech to infants was recorded by the video-tape films made. At times, however, the quality of sound or a sudden change in pitch or tone in the mother's voice made the transcription of utterances impossible, then such utterances were labelled as Unclear/Inaudible.

Two points are necessary to consider when the transcription of speech is attempted. First contextual features are most important for later analysis. This is not a simple procedure but a necessary one. The accuracy of studies in which only brief and cursory references to contextual cues are made, should be doubted.

Second, in transferring speech from its auditory medium to a written system, care is needed. Fortunately however a speaker of a language can easily transcribe most speech which is heard. This should be done without any attempt to grammatically correct the utterances. At times marking the speech into discreet units, ie., those of the sentence, may be a problem. One has to use the concept of sentence ungrammatically to equate it to an utterance. Utterance boundaries are marked by a

final intonation contour, with a pause usually occurring after an utterance. Often the end of an utterance may be distinguished by grammatical cues as well as logical or expressive ones.

The reliability of transcribing mothers' speech was examined for this study. Two hearers transcribed the utterance. This was done using the speech of three different mothers which occurred at each 10 second intervals of the video-film. The following results were obtained.

(1) General agreement of utterance (with not more than two words different) : 1,00 or 100% agreement.

(2) Word recording agreement (using all the words in the task) : ,96 or 96% agreement.

These scores are all significant to the $P = ,01$ level using the chi square test.

Finally transcripts were obtained which recorded the four mothers' speech to their infants over a total period of two years. A final sample of 4,492 utterances from the mothers was obtained which included 3,405 two-word or longer utterances and is represented by 13,241 words. This sample was used to determine the mothers' scores on each measure.

It should be noted that 10 minute sessions which contained fewer than 20 utterances from the mother were excluded from this sample. Such a paucity of speech yields absurd results where analysed by the

Each of these measures is discussed fully in 4.0 the Discussion.

One aim of this project was to test the validity of earlier statements on the nature of mothers' speech to differently aged infants, by using a longitudinal sample of this speech.

3.3.2. Functional analysis.

In addition to the syntactic measures above an analysis of the Functional aspect of Mothers' speech was used. This analysis follows that of Jacobson (cited by Bruner (1974) with some modifications). It also incorporates Halliday's (1975) attempt at a functional description of messages.

The functions used were:

- (a) The Conative Function : a message formed in such a way as to produce a desired behaviour in the addressee e.g., a command, request, etc.
- (b) The Heuristic Function : a message which provides information about the world or may give informative instructions as to how to act e.g., labelling objects, commenting on objects, etc;
- (c) The Reciprocal Function : a continuation of a sequence of interaction which may be in accordance with or contrary to the previous speaker's intention e.g. complying with a request, accepting an object, etc.
- (d) The Expressive Function : accompaniments to the addressor's feelings, e.g. Oh dear;

- (e) The Terminating Function : a message terminating a sequence of interaction, e.g., goodbye.

An unclassifiable category was also used. The usefulness of this approach in analysing speech and the need for this type of analysis is fully examined in the Discussion.

Using three observers, a reliability study found a 90% agreement on the assignment of functions. This level of agreement differs significantly from the expected chance agreement at the ,01 level of significance, using the chi square test.

3.3.3. Message descriptions.

A final analysis of the corpus included a description of the type of message from the mother. The following is the list of descriptions or Glosses used in this study :

1. Requesting an object (option of refusal).
2. Demanding an object (no option of refusal).
3. Offering an object.
4. Accepting an offered object.
5. Refusing a requested/demanded object.
6. Labelling an object.
7. Comment on an object.
8. Locating an object (deixis).
9. Requesting permission to act.
10. Requesting an action (with option of refusal).
11. Command to act.

12. Complying with request/command for action or granting permission to act.
13. Refusing to act as requested/commanded or refusing permission to act.
14. Instructing how to act.
15. Demonstrating an action.
16. Scaffolding (assisting in the carrying out of an action).
17. Comment on partner's action.
18. Comment on own action.
19. Demanding attention.
20. Expressing approval.
21. Expressing disapproval.
22. Expressing sympathy.
23. Imitating an action.
24. Requesting information.

An interesting feature of this Functional and Gloss analysis is that it enables one to examine the linguistic and non-linguistic cues of the interaction between the mother and her infant. It should be noted that the glosses are essentially descriptions of illocutionary force (except number 23).

4.0. DISCUSSION.

The results and discussion of the corpus of mothers' speech used in this study will be conflated and presented in three parts.

Part I outlines a Quantitative description of the mothers' speech. The results of this analysis will be compared to those of earlier works, to see if the hypothesis that mothers' speech is both simple and redundant, is upheld.

Part II compares the four mothers' speech to see whether there are differences in the speech which may be dependent on the child's age. A Longitudinal trend analysis tests whether each mother's speech changes over the period of time used.

Part III presents a Functional analysis of mothers' speech as well as a Descriptive study. Here the emphasis is on speech in use as a means of sending messages in the communicative process of interaction.

Due to the variety of methods used to analyse the corpus of speech, the three different approaches are discussed separately. These are combined in the Conclusion which integrates the findings.

4.1. PART 1 : A DESCRIPTION OF MOTHERS' SPEECH TO INFANTS

4.1.1. The Simplicity/Redundancy hypothesis:

The suggestion that mothers' speech to infants is both simple and redundant is expressed in the works of Catherine Snow (e.g. 1973, 1974, 1975 and with Arlman-Rupp Hassing, Jobse and Vorster 1976) and in the work of Juliet Phillips (1970a and b, 1973).

This hypothesis criticises the view that language learning infants are exposed to a complex inarticulate system. Snow (1974) suggests that:

'No one has to learn to talk from a confused, error-ridden garble of opaque structure'. (pg.6).
and Snow, Arlman-Rupp, Hassing, Jobse and Vorster (1976) note that:

'Children have a very simple, correct redundant and consistent sample of utterances available to them'.
(Pg. 1).

This conclusion includes empirical data from several research workers e.g., Broen (1972), Remick (1972) as well as Phillips' and Snow's earlier work. Further testing the applicability of this hypothesis on a non-English speaking sample Snow et al (1976) conclude that:

'Mothers' speech in Dutch showed the same characteristics of simplicity and redundancy found in other languages.' (Snow et al pg. 1).

Phillips (1970a and b) analysed the speech from mothers to three different age groups : 8, 18 and 28 month olds, concluding as follows:

'On the basis of these results, we can affirm that, during the period when children develop basic language skills, the language addressed to them is specialized and not representative of the language spoken among adults.' (pg. 7).

The first task of this study was the analysis of mothers' speech, to see whether the obtained description of mothers' speech may be incorporated into or excluded from the above hypothesis. The measures of speech used have been briefly described in 3.0 the Method of Analysis (pg.50). As noted, 10 minute sessions of speech form the equal time span necessary for the comparison of speech within and between each mother. The measures used describe the speech which all four mothers use, to address their infants.

4.1.2. Mean Length of Utterances (MLU).

One of the commonest measures used to date, as an indicator of complexity of speech, is that of the Mean Length of Utterances, the MLU. Snow (1975) in grouping the data obtained by various workers, found that the MLU reported varied between 2 and 6 words. On this evidence fairly wide support was claimed for the idea that mothers' speech to children tended to be simpler than speech which was addressed to adults. In this study a range in MLU of 1,79 and 4,85 words was found. The average MLU in this sample varied from 2,68 to 4,27 words. The range of scores and averages presented here incorporate the two MLU measures used in this study : (a) the MLU of all utterances from the mother: MLU All and (b) the MLU of all utterances of two words or longer (i.e. one word utterances excluded): the MLU 2 word and longer. The data is as follows:

TABLE 3

The Range and Average of the Mean Length of Utterances
in Mothers' Speech.

TABLE 3.1. MLU All utterances:

MOTHER OF	RANGE	\bar{X}	SD
OLIVER	3,41 - 4,32	3,87	0,25
KERRYNN	1,79 - 3,79	2,81	0,53
SARAH	2,06 - 3,47	2,68	0,31
JULIE	2,27 - 3,28	2,76	0,28

TABLE 3.2. MLU 2 word and longer utterances (i.e.
one-word utterances type excluded)

MOTHER OF	RANGE	\bar{X}	SD
OLIVER	3,37 - 4,85	4,27	0,41
KERRYNN	2,38 - 4,44	3,38	0,53
SARAH	2,46 - 4,13	3,37	0,37
JULIE	3,13 - 3,62	3,40	0,10

Note: Throughout Part 1 the Range ; Average \bar{X} and
Standard Deviation (SD) for each mother's
speech are presented.

The above figures fall well within other workers'
empirical criterion for maintaining that Mothers'
speech to infants is simple.

4.1.3. Maximum Utterance Length

This measure also gives some indication of the
complexity of Mothers' speech. The range in maximum
length as well as the average maximum length of utterances

in the corpus of speech used in this study are as follows:

TABLE 4.

The Range and Average of the Maximum Utterance Length in Mothers' Speech.

MOTHER OF	RANGE	\bar{X} Maximum	SD
OLIVER	9 - 18 words	12	2,56
KERRY	4 - 10 words	7,2	1,60
SARAH	5 - 12 words	8,1	2,01
JULIE	6 - 12 words	8,7	1,49

Once more the data indicates that mothers use short utterances on average when addressing their children in the low scores in the range of 4 - 6 words. It should be noted that the maximum lengths being referred to here were, for the most part, far longer than the other utterances in each session (as suggested by the MLU measures). Hence the range of scores in Oliver's mother's speech may be misleading.

4.1.4. Type Token Ratio (TTR).

This measure of speech is commonly used to indicate the richness of a speaker's vocabulary. The nearer to 1,00 that this ratio comes, the richer is the vocabulary being examined.

In this study the Range and Average in TTR for the sample used is as follows:

TABLE 5.

The Range and Average of the Type Token Ratio in Mothers' Speech.

MOTHER OF	RANGE	\bar{X}	SD
OLIVER	0,30 - 0,55	0,42	0,08
KERRYNN	0,28 - 0,58	0,42	0,08
SARAH	0,24 - 0,48	0,32	0,07
JULIE	0,25 - 0,59	0,36	0,10

In general the TTR is low : 0,24 - 0,59 suggesting that the mothers use a restricted vocabulary when talking to their infants. The range of TTR, from 0,24 to 0,59 suggests that only a quarter to half the words which mothers use to their children are different to each other. However, caution is necessary when using this measure as most workers use a constant number of words for comparing speech. Using small equal samples of speech tends to yield larger ratios than those presented here.

4.1.5. One Word Utterances.

This measure is used to support the view that mothers' speech is simple i.e., a large proportion of one word utterances indicates simplicity of speech. In this study the frequency count of one word utterances used by the mother in each session was converted into a Ratio of all the utterances in that session. The Range and average of the sample used here, for this

measure are as follows:

TABLE 6.

The Range and Average in the Ratio of one word Utterances in Mothers' Speech.

MOTHER OF	RANGE	\bar{X}	SD
OLIVER	0,05 - 0,28	0,12	0,06
KERRYIN	0,11 - 0,45	0,25	0,11
SARAH	0,11 - 0,44	0,29	0,07
JULIE	0,13 - 0,46	0,26	0,11

On average as much as a quarter of Mothers' speech is made up of one word utterances.

The range in this measure at times approaches half the utterances from the mother, i.e., 0,44 - 0,46.

4.1.6. Repetitions.

The hypothesis that Mothers' speech is redundant in nature was suggested after an examination of the amount of repetitions which occur in their speech. The most complete use of this measure is Kobashigawa's (1969) study from which the criteria of a Repetition were taken. A Repetition is defined as an utterance which occurs within three consecutive utterances after the original utterance. It may be an Exact or a Semantic Repetition. Exact Repetitions are self-evident; however, Semantic repetitions are defined to include utterances with the same meaning as the original, but differing in form. These differences may be in word order, e.g., 'Look Sarah' and 'Sarah look'

or as additions to the original utterance 'Ta' and 'Ta to mummy'. Partial repetitions are also included e.g., 'Look at the kitty' and 'Look at that' (providing here of course that the object of reference is still the same). It is interesting to note from the examples given here that this measure also indicates the modification of messages by the mother in her speech to her child.

The various repetitions have been grouped in the present work and expressed as a proportion of the total number of utterances used by the mother in each session. The range and average of the sample in this score are as follows:

TABLE 7.

The Range and Average in the Ratio of Repetitions in Mothers' Speech.

MOTHER OF	RANGE	\bar{X}	SD
OLIVER	0,08 - 0,20	0,13	0,04
KERRYNN	0,06 - 0,46	0,24	0,11
SARAH	0,11 - 0,37	0,25	0,06
JULIE	0,15 - 0,42	0,31	0,07

Once more, as in mothers' use of one word utterances, it appears that a large proportion of mothers' speech is repeated (0,13 - 0,31). Also at times Repetitions come to make up nearly half (0,46) of mothers' speech to their children. This data closely follows Kobashigawa's findings.

4.1.7. Part of Speech Analysis.

The further aspect of research into the simplicity of mothers' speech is the analysis of the levels of Complexity which Mother-Infant speech attains. Hence workers examine the parts of speech and/or phrases used by mothers, to note the degree to which Mothers' speech approaches the speech which adults use when addressing each other.

In analysing how different parts of speech were used by mothers over time, elaborate statistical techniques were used. However these failed to indicate much. Factor analysis suggested that all parts of speech generally tend to hang together, with little change in their usage, over time. An Analysis of Variance only clouded the issue. It was therefore decided to select parts of speech and phrases which may be of importance to speech. This selection used Gleason (1965) who presents the following eight parts of speech, traditionally associated with English grammatical analysis. Noun; Pronoun; Adjective; Verb; Adverb; Preposition; Conjunction and Interjection. The parts of speech chosen for individual analysis were (a) Verbs (and verb combinations e.g., where's; that's; etc) and (b) Adjectives and Adverbs which are grouped together as modifiers of speech. These have interesting implications. Verbs form the fundamental pivot of most sentences in English and also

have important associations in terms of action on the world. Modifiers play a vital role in the qualification of messages, by adding a more complex dimension. The Phrase usage of mothers was also analysed. Here verb and noun phrases were extracted from the mothers' speech. Part of speech frequency counts were converted into proportions of the number of utterances in each session, i.e., .50 indicates that half the utterances had the particular part of speech in them; and 2.00 indicates that each utterance had two such parts of speech. Phrase frequency counts were also converted into proportions. Only 2 word or longer utterances were used here as phrases can only occur in longer utterances. The technique of 'paraphrasing' mothers' utterances to determine their grammatical structure (as used by Snow et al (1976) was not used. Little reliability was obtained when this type of analysis was attempted by the present author. The range and average occurrence of the parts of speech used and the phrases analysed are as follows:

TABLE 8.

The Range and Average of Parts of Speech and Phrases
used by different Mothers.

TABLE 8.1. The Ratio of Verbs to other parts of speech

	RANGE	\bar{X}	SD
OLIVER	0,95 - 1,22	1,12	0,09
KERRYIN	0,43 - 1,30	0,93	0,19
SARAH	0,54 - 0,95	0,74	0,19
JULIE	0,80 - 1,09	0,85	0,16

TABLE 8.2. The Ratio of Modifiers to other parts of speech

	RANGE	\bar{X}	SD
OLIVER	0,30 - 0,59	0,44	0,09
KERRYIN	0,05 - 0,40	0,21	0,15
SARAH	0,07 - 0,38	0,18	0,09
JULIE	0,16 - 0,73	0,42	0,23

TABLE 8.3. The Ratio of Verb Phrases used

	RANGE	\bar{X}	SD
OLIVER	0,71 - 0,96	0,83	0,08
KERRYIN	0,70 - 1,18	0,93	0,12
SARAH	0,43 - 0,85	0,67	0,12
JULIE	0,62 - 0,83	0,72	0,09

TABLE 8.4 The Ratio of Noun Phrases used

	RANGE	\bar{X}	SD
OLIVER	0,29 - 0,76	0,55	0,14
KERRYIN	0,22 - 0,68	0,39	0,12
SARAH	0,11 - 0,43	0,33	0,10
JULIE	0,16 - 0,42	0,23	0,08

Although a direct comparison with Adult speech to Adults has not been made here, an intuitive comparison is suggested. Here there is a limited use of Verbs per utterance i.e., from nearly half the utterances from mothers having verbs to more than one verb per utterance (0,43 to 1,30). The verb phrase analysis yields similar results. The lower range suggests a limited use of verb phrases by mothers in speaking to their children, i.e., 0,43 to 1,18. Modifier usage in Mothers' speech is scarce i.e., from almost no Modifiers per utterance to three-quarters of the utterances having a Modifier. (0,05 to 0,73). Noun phrase usage follows a similar pattern to Modifier usage, i.e., a ratio of 0,11 to 0,76 occurs.

Added to the above data is the observation that the verb form which mothers use seldom departs from the present tense. This was first observed by Phillips (1970 a and b) and upheld by other workers.

4.1.8. Conclusion.

These findings agree with past research which described mothers' speech to infants as both simple and redundant in nature. Such speech contains short utterances - as measured by the Mean Length of Utterances; has a limited vocabulary - as measured by the Type Token Ratio; has a large number of one word utterances and has a high incidence of Repetitions. Added to these features, is a low frequency in the use of verb and verb phrases and a limited Noun Phrase and

Modifier usage.

Support is thus claimed for the view that mothers' speech to infants appears to be both simple and redundant. However, the measures used have limitations. These will be discussed in the following Part of this work.

Finally a methodological issue must be raised. In comparing the mothers as above, it is important to remember that they are different mothers, addressing infants of different ages. Thus care is necessary in forming generalizations from the comparison made, as the factors influencing the differences between the mothers have not been separated.

4.2. PART 11 : A TREND ANALYSIS OF CHANGES IN MOTHERS' SPEECH OVER TIME.

4.2.1. Cross Sectional Changes

As already discussed, earlier research compared mothers' speech to infants to speech addressed to adults to show empirically whether these two types of speech differ from each other. This was done in the following manner. Studies usually selected two groups with a fairly large age difference e.g., Drach (1969) used an Adult and a 26 month old child; Remick (1972) used several adults and a sample of 16 to 30 month old children; Broen (1972) used adults with 18 and 45 month (nearly 4 years old) children; Phillips (1970 a and b) studied adults and 8, 18 and 28 month olds; and

finally, Snow (1972) used adults and children of 2 to 10 years of age. In each study, differences were found between the speech which mothers addressed to children of various ages and the speech which mothers used when addressing adults. Vorster's (1974) review (as discussed in the Literature Review) outlines the conclusion of these studies as follows. The speech which mothers send to their infants or young children differs, in a number of ways and on a variety of measures, from speech to adults.

Using the data presented in Part 1 (Tables 3 - 8) each mother's speech will now be compared to examine the differences between the mothers in addressing their children. It is assumed that the age of the child rather than any additional influence from the mother personally creates the differences between their speech. That is, as speakers of a common language system, great individual differences in the use of the system are not anticipated. Rather the cues from the child are seen as the source of influence to the mothers' speech. However, this comparison is not a simple one and discrepancies do occur. In fact, the speech with which mothers address their infants does not seem to get progressively more complex, as the child ages.

The age range of the sample is : Julie from birth to 23 weeks; Sarah from 23 to 65 weeks; Kerry from 48 to 104 weeks and an overlap in the upper part

of Kerry's age range in Oliver, from 69 to 93 weeks (See Plot 1 Pg.51). The Range and Mean scores on different measures are outlined below.

In most of the measures, Oliver's mother's speech scores highest on the average score e.g., in MLU; Maximum Utterance length; Type Token Ratio; Verb and Modifier usage and Noun Phrase usage. This mother's speech scores lowest in the use of one word utterances and the use of repetitions. One may therefore conclude that, on these measures, Oliver's mother's speech is overall the most complex of the sample.

Kerry's mother's speech falls second to Oliver's mother's in most of the measures used. Although this child was studied to an older age than Oliver, data collection and analysis began at a much earlier age, hence the slight reduction in Means in this (Kerry's) mother's speech. It is of interest to note that Kerry's mother has the smallest maximum utterance length. However, the MLU measure is a more accurate assessment of utterance length. Kerry's mother's speech also follows Oliver's mother's speech in a low frequency of one word utterances and repetitions.

Sarah's mother's speech, is interesting in that this mother scores lowest on nearly all measures of her speech, despite the fact that her child is not the youngest in the sample. In MLU; Type Token Ratio; Verb and Modifier usage and in Verb Phrase usage, Sarah's

mother is the lowest scorer. Her speech is the second lowest of the sample in the Maximum Length of Utterance and Noun Phrase usage measures. Also this mother's speech is highest in one word utterance usage and a little behind Julie's mother's speech for the most repetitions. A possible explanation for this could be Phillips' (1970 a and b) idea that mother's speech:

'seems to have a point of origin or a floor at some time around the first birthday'. (pg. 7).

That is at about 52 weeks, Phillips suggests that a mother begins to receive linguistic feedback from her child. At an earlier age, say 30 weeks, a mother receives little feedback to which she can adjust the level of her speech, as in Julie's mother's speech which scores higher than Sarah's mother in most measures. Whereas the Sarah data, covering the 52 week age range, scores as lower than Julie's mother's speech. However, part of Phillips' observations have not been upheld; that speech to 8 month and 28 month children is the same. This was not found in this study. Julie's mother's speech scores are lower, in all the measures used, than Oliver's and Kerry's mothers' speech. However, the children used here are younger than the 28 month sample used by Phillips. As yet, the difficult issue of changes in mothers' speech is by no means solved. A Table follows which places each Mother's Mean score in each measure in Rank Order.

TABLE 9.

The Rank Order of Mothers' Average Scores on all the measures used to assess their Speech.

MEASURE	1st	2nd	3rd	4th
MLU All	O	K	J	S
MLU more than 2 words	O	K	J	S
Max. length	O	J	S	K
Type Token	O & K	-	J	S
1 word utterances *	S	J	K	O
Repetitions *	J	S	K	O
Verb usage	O	K	J	S
Modifier usage	O	J	K	S
Verb phrases	K	O	J	S
Noun phrases	O	K	S	J

*

Note: On these two measures a high Rank suggests greater simplicity or redundancy. On all other measures, a higher Rank suggests a higher degree complexity.

4.2.2. Longitudinal Trends.

For a fuller presentation of the differences which occur between and within mothers' speech, a Longitudinal analysis is necessary. This trend analysis examines whether a mother's speech to her infant changes as the child ages. There is a surprising lack of detail in this type of research in studies to date. Only large age differences in infants have been used to note any changes in mothers' speech.

Here an analysis is presented which examines mothers' speech at two-weekly intervals. The sample size is constant throughout, 4,492 utterances from four mothers are used. This includes 3,405 two-word or longer utterances and represents 13,241 words. Pearson Product Moment correlations were performed to note changes over time in each mother's speech as reflected in each measure. This analysis also tests the significance of the trends which emerged. Also Chi-square tests were performed on the first and last of each mother's score on the measures used. This gives a crude indication of any change in mother's speech over the data time span.

4.2.2.1. Trends in each measure used

The various measures used and trends which they yield are as follows:

- ia) The Number of Utterances from the Mother to her Child.

Here the count of utterances in each 10 minute session is used as a measure of the quantity of Mothers' speech. Positive linear trends emerge for all but one of the mothers in the sample, (where this measure is correlated with the child's age) i.e., all mothers increase their amount of speech to their infants. Three of the trends are significant, although that of Julie's mother is weak.

TABLE 10.

The Correlation of the Number of Utterances used
by Mothers vs. the age of their child.

CHILD	r value	Significance level
OLIVER	,659	P = ,05
KERRYNN	,058	non-significant
SARAH	,478	P = ,05
JULIE	,491	P = ,10

ib) The Number of Words from the Mother to her Child
(See Plot 3).

As in (1a) the count of words in each session also indicates the quantity of the mothers' speech and is a useful cross-check with the Number of Utterances measure. Positive linear trends emerge for three of the mothers (as in 1a) when this measure is correlated with the child's age. All these trends are significant (once again the trend of Julie's mother is weak).

TABLE 11.

The Correlation of the Number of Words used by
Mothers vs. the age of their child.

CHILD	r value	Significance level
OLIVER	,717	P = ,02
KERRYNN	- ,005	non-significant
SARAH	,526	P = ,05
JULIE	,485	P = ,10

ii) The Mean Length of Mother's Utterances.

(a) Using all the utterances from the mothers

(See Plot 4).

This measure is the most popular used to date and is obtained by dividing the number of words in each session by the number of utterances.

Positive trends occur in all the mothers' speech over time and it therefore appears that all the mothers increased the length of their utterances as their infants developed. However, only in Sarah's mother's speech was this trend significant. Oliver's mother, in her speech showed a non-significant trend whereas both Kerry's and Julie's mothers show no trends.

TABLE 12

The Correlation of the Mean Length of Mothers' Utterances vs. the age of their child.

CHILD	r value	Significance level
OLIVER	,42	non-significant
KERRY	,057	non-significant
SARAH	,473	P = ,05
JULIE	,08	non-significant

(b) Using only 2 word (or longer utterances from mothers.

(See Plot 5).

This was done to indirectly examine the influence of one word utterances from the mothers and to see

if two word or longer utterances showed trends over time. Once again Sarah's mother's speech shows the only significant positive trend. In Julie's mother's speech a non-significant negative trend emerges.

In Oliver's and Kerry'n's mothers' speech however, no trends are noted.

TABLE 13

The Correlation of the Mean Length of only Two Word and longer utterances from mothers vs. the age of their child.

CHILD	r value	Significance level
OLIVER	,06	non-significant
KERRY'N	- ,016	non-significant
SARAH	,612	P = ,01
JULIE	- ,223	non-significant

iii) Range in Mothers' Utterance Length

(See Plot 6).

Here the maximum utterance length from the mother was noted in each session. This is a cross-check of (iib) the MLU of two word and longer utterances.

More marked trends occur than those of (iib) probably as the range measure is cruder. Oliver's and Sarah's mothers' speech both yield significant positive trends (with Oliver's mother's being weak) when this measure is correlated with their child's

age. Julie's mother's speech yields a non-significant negative trend and Kerry's mother's speech shows no trend.

TABLE 14

The Correlation of the Maximum Length of Utterances
from Mothers vs. the age of their child.

CHILD	r value	Significance level
OLIVER	,577	P = ,10
KERRY	,073	non-significant
SARAH	,668	P = ,01
JULIE	- ,205	non-significant

iv) Repetitions in Mothers' speech
(See Plot 7).

Here both identical repetitions and 'semantic' repetitions (Kobashigawa, in Drach et al 1969) were combined. A ratio of these repetitions to all mothers' utterances was then computed.

Julie's mother's use of repetitions is positively but non-significantly correlated to her child's age. Kerry's mother in her use of repetitions shows a significant negative trend over time. However, both Sarah's and Oliver's mothers' speech show no trend in this measure.

TABLE 15

The Correlation of the Ratio of Repetitions in Mothers' speech vs. the age of their child.

CHILD	r value	Significance level
OLIVER	- ,004	non-significant
KERRYNN	- ,61	P = ,01
SARAH	,057	non-significant
JULIE	,17	non-significant

v) The Type Token Ratio of Mothers' Speech
(See Plot 8)

This is also a popular measure which divides the number of different words in a sample by the total number of words in that sample. The larger the ratio yielded the more diverse the vocabulary being used.

Only Kerryyn's mother's speech showed a significant positive trend on this measure over time. The rest of the sample yielded negative correlations. Oliver's and Julie's mothers' speech trends on this measure were significant.

These surprising trends are probably due to the use of this measure in this study. Previous workers used constant samples of speech in calculation of this Ratio. In this study the whole sample of mothers' speech per 10 minute session was used. This appears to distort the proportion for as the number of words per session increases greatly, the ratio of

different words i.e., the Type Token Ratio, decreases.

TABLE 16

The Correlation of the Type Token Ratio in Mothers'
Speech vs. the age of their child

CHILD	r value	Significance level
OLIVER	- ,624	P = ,05
KERRYNN	,66	P = ,01
SARAH	- ,349	non-significant
JULIE	- ,567	P = ,05

vi) One Word Utterances in Mothers' Speech

(See Plot 9)

Here the proportion of one word utterances was computed by dividing the number of one word utterances in each session by the total number of utterances.

All the trends were non-significant. That of Oliver's mother was negatively correlated whereas that of Sarah's mother's use of one word utterances was positively correlated. Both Kerry'n's and Julie's mothers' speech yielded no trend.

TABLE 17

The Correlation of the Proportion of one word
Utterances from mothers vs. the age of their child

CHILD	r value	Significance level
OLIVER	- ,398	non-significant
KERRYNN	- ,075	non-significant
SARAH	,158	non-significant
JULIE	,032	non-significant

vii) Parts of Speech used by Mothers.

Throughout this section, definitions of Parts of Speech were obtained from Jackson's University English Course.

Here verbs and modifiers (adjectives and adverbs) and noun phrases and verb phrases (which cross-check the verb measure) are presented. All counts were converted into proportions of the utterances in the 10 minute sessions from which the scores were obtained.

(a) Verbs used by Mothers.

(See Plot 10).

Positive trends emerged for three mothers, Kerry'n's, Sarah's and Julie's when their verb usage was correlated to the age of their child. Only Sarah's mother's speech trend was significant. Oliver's mother's speech yielded a non-significant negative trend.

TABLE 18

The Correlation of the Ratio of Verbs used by
Mothers vs. the age of their child

CHILD	r value	Significance level
OLIVER	- ,248	non-significant
KERRYNN	,19	non-significant
SARAH	,60	P = ,01
JULIE	,41	non-significant

(b) Verb phrases used by mothers

(See Plot 11).

Similar trends as (a) were yielded. Sarah's mother's verb phrase usage correlated positively and significantly to her child's age. Kerry's mother's verb phrase usage correlated positively and was weakly significant. Oliver's and Julie's mothers' verb phrase usage yielded no trend.

TABLE 19

The Correlation of the Ratio of Verb Phrases used
by Mothers vs. the age of their child

CHILD	r value	Significance level
OLIVER	- ,006	non-significant
KERRYNN	,44	P = ,10
SARAH	,69	P = ,01
JULIE	,042	non-significant

(c) Modifiers used by Mothers

(See Plot 12)

Here negative trends occurred in both Sarah's and Julie's mothers' speech (when this measure was correlated with the age of the child.) However, only Julie's mother's trend was significant. Kerry's and Oliver's mothers' use of modifiers showed no trend.

TABLE 20

The Correlation of the Ratio of Modifiers used by Mothers vs. the age of their child

CHILD	r value	Significance level
OLIVER	- ,045	non-significant
KERRY	,048	non-significant
SARAH	- ,31	non-significant
JULIE	- ,594	P = ,05

(d) Noun Phrase usage by Mothers

(See Plot 13)

When correlated to their child's age, both Oliver's and Sarah's mothers' Noun phrase usage showed significant positive trends. Kerry's and Julie's mothers, on the other hand, yielded non-significant negative trends in their speech in this measure.

TABLE 21

The Correlation of the Ratio of Noun Phrases used
by Mothers vs. the age of their child

CHILD	r value	Significance level
OLIVER	,76	P = ,01
KERRYNN	- ,104	non-significant
SARAH	,60	P = ,01
JULIE	- ,18	non-significant

A summary of trends in the above measures appears below.

TABLE 22

A Summary Table of Trends in the Speech of all Mothers,
in all measures used

MEASURE	OLIVER	KERRYNN	SARAH	JULIE
ia) No. of utterances	(* +)	(o)	(* +)	(* +)
ib) No. of words	(* +)	(o)	(* +)	(* +)
iaa) MLU of all utterances	(+)	(o)	(* +)	(o)
iab) MLU of 2 word or longer utterances	(o)	(o)	(* +)	(-)
iii) Range in utterance length	(* +)	(o)	(* +)	(-)
iv) Repetitions in speech	(o)	(* -)	(o)	(+)
v) Type Token Ratio	(* -)	(* +)	(-)	(* -)
vi) 1 Word utterances	(-)	(o)	(+)	(o)
vii) Verb usage	(-)	(+)	(* +)	(+)
b) Verb phrase usage	(o)	(* +)	(* +)	(o)
c) Modifier usage	(o)	(o)	(-)	(* -)
d) Noun phrase usage	(* +)	(-)	(* +)	(-)

Significant trends are denoted by an asterix and the direction of the trend e.g. (* +) or (+ -). Non-significant

trends are shown by only recording the direction of the trend e.g. (+) or (-). No relationship between the variables concerned is denoted by a zero (0).

4.2.2.1.1. Chi-Square test analysis of changes in Mothers' Speech to Infants.

To supplement the Pearson Product Moment analysis outlined above, a Chi-square test of some measures of speech was performed. The scores of the first and last session of each mothers' speech were compared. Ratio and average measures cannot be used here as they do not reflect sufficient change due to their control by an increasing denominator. The following results were obtained for changes in the measures listed.

TABLE 23

A Chi-square Analysis of Trends in the Speech of all Mothers, on all the measures used

MEASURE	OLIVER SCORES	KERRY SCORES	SARAH SCORES	JULIE SCORES
la) No. of utterances from Mother Chi	76-114 ** 7,20	42-34 ,64	77-123 ** 10,12	29-109 **48,24
ib) No. of words from Mother Chi	284-492 **42,87	86-128 ** 7,84	196-350 **42,86	82-305 **127,35
iii) Range in utterance length (in words) Chi	11-18 1,24	418 ,56	6-10 ,56	8-9 0,0
iv) Number of Repetitions Chi	13-13 0,0	17-5 *5,50	18-28 1,76	4-29 **17,44
vi) No. of 1 word utter- ances Chi	8-9 0,0	19-6 *5,76	21-35 3,00	4-17 **6,84

* = Significant to $P = ,05$

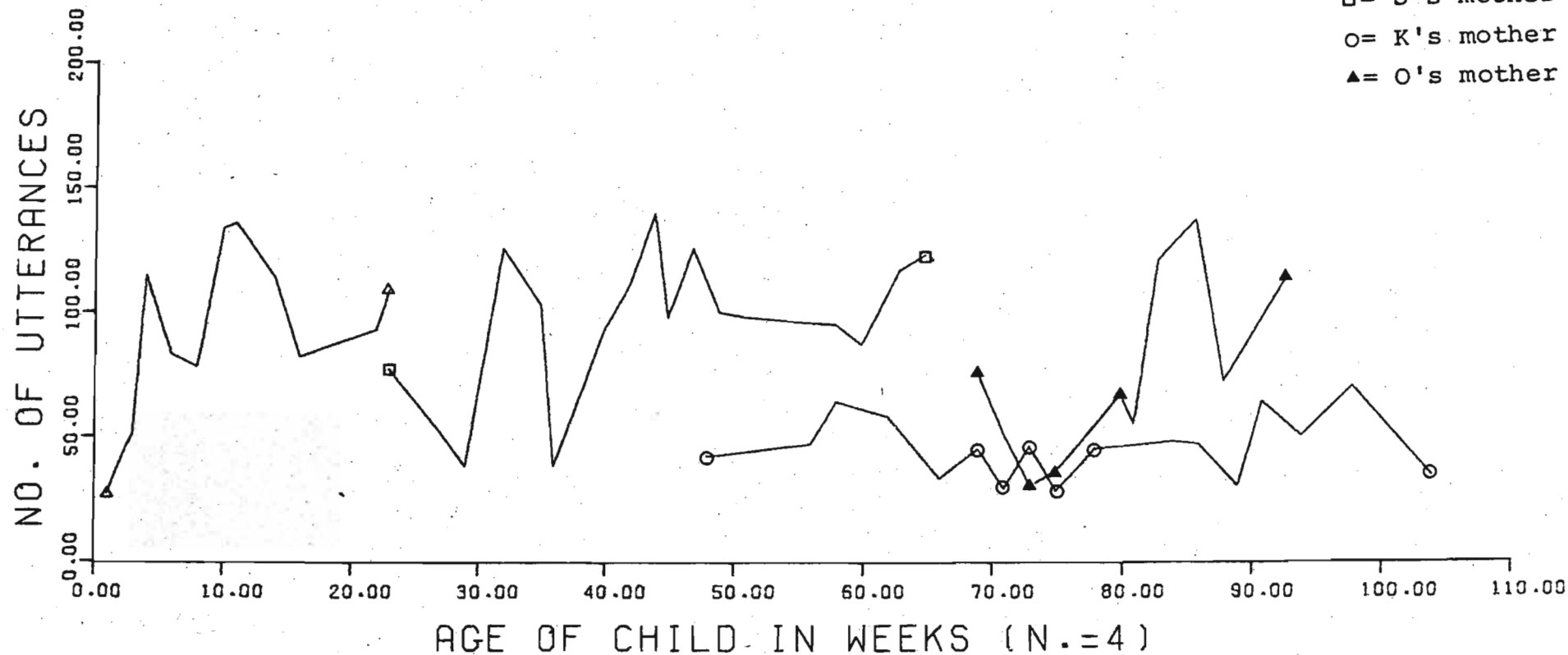
** = Significant to $P = ,01$

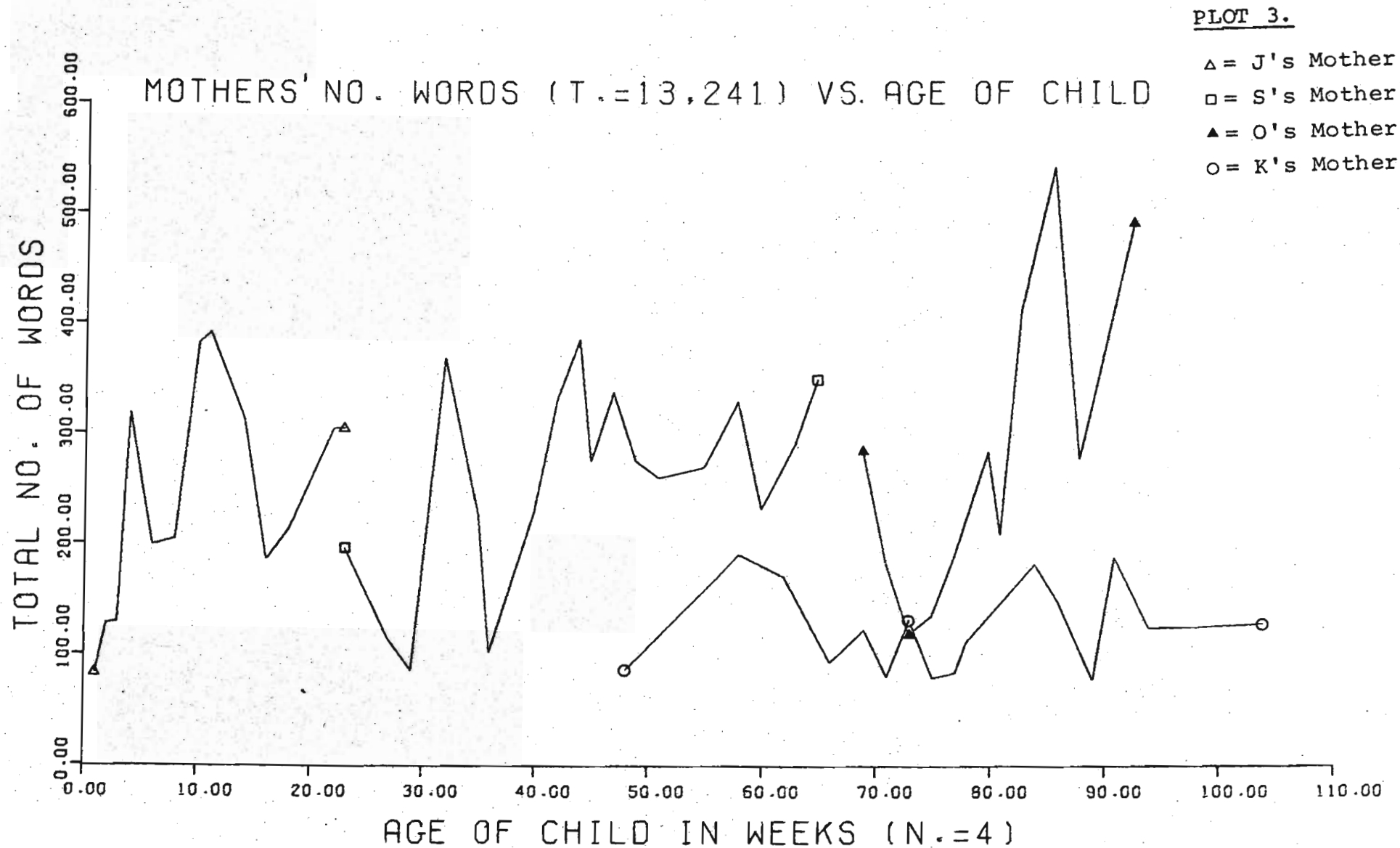
All other values are non-significant

MOTHERS' UTTERANCE (T.= 4,492) VS. AGE OF CHILD

PLOT 2.

△= J's mother
□= S's mother
○= K's mother
▲= O's mother

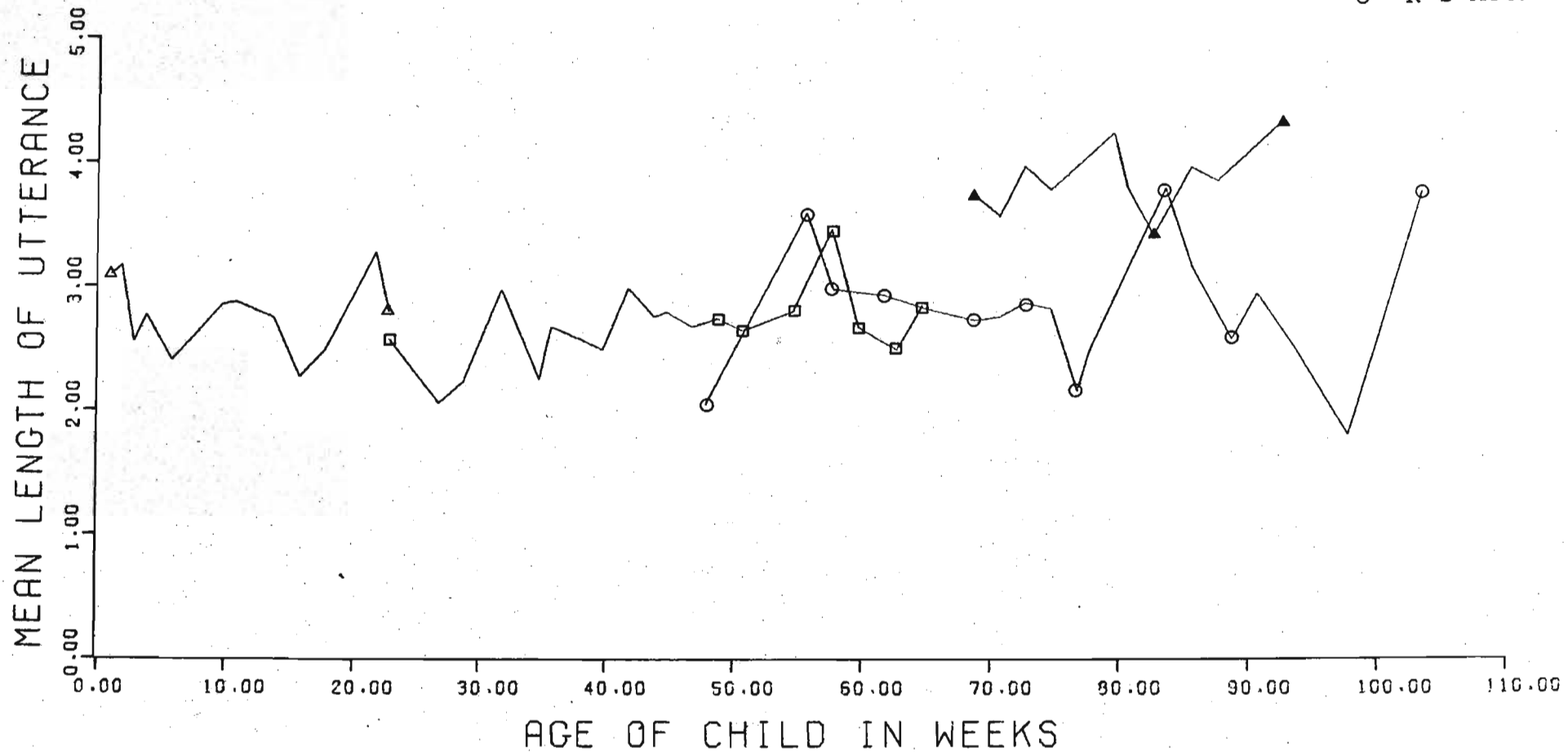




MOTHERS' MLU , ALL , VS. AGE OF CHILD

PLOT 4.

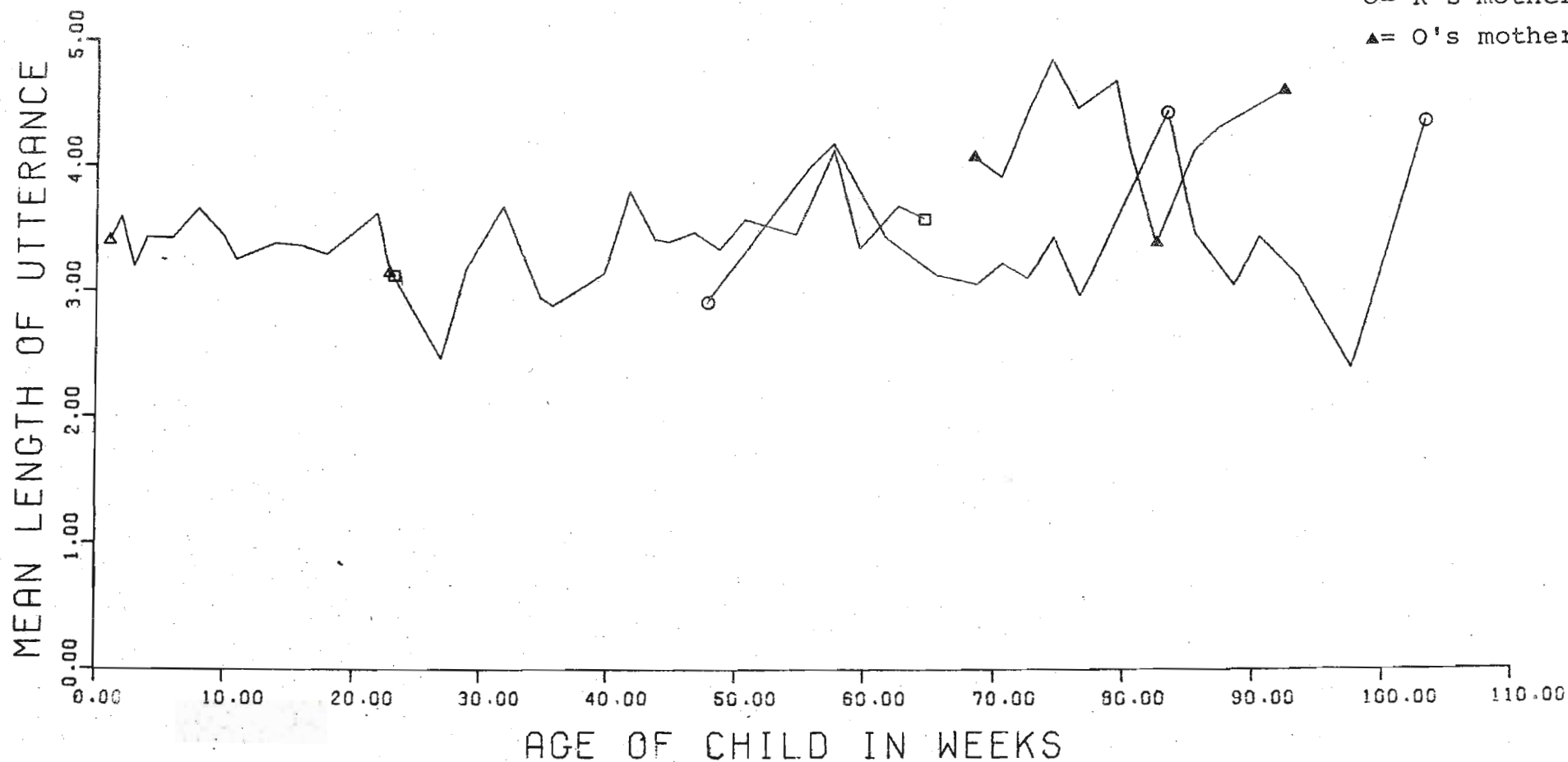
△ = J's Mother
 □ = S's Mother
 ▲ = O's Mother
 ○ = K's Mother



MOTHERS' MLU ,2WD, VS. AGE OF CHILD

PLOT 5.

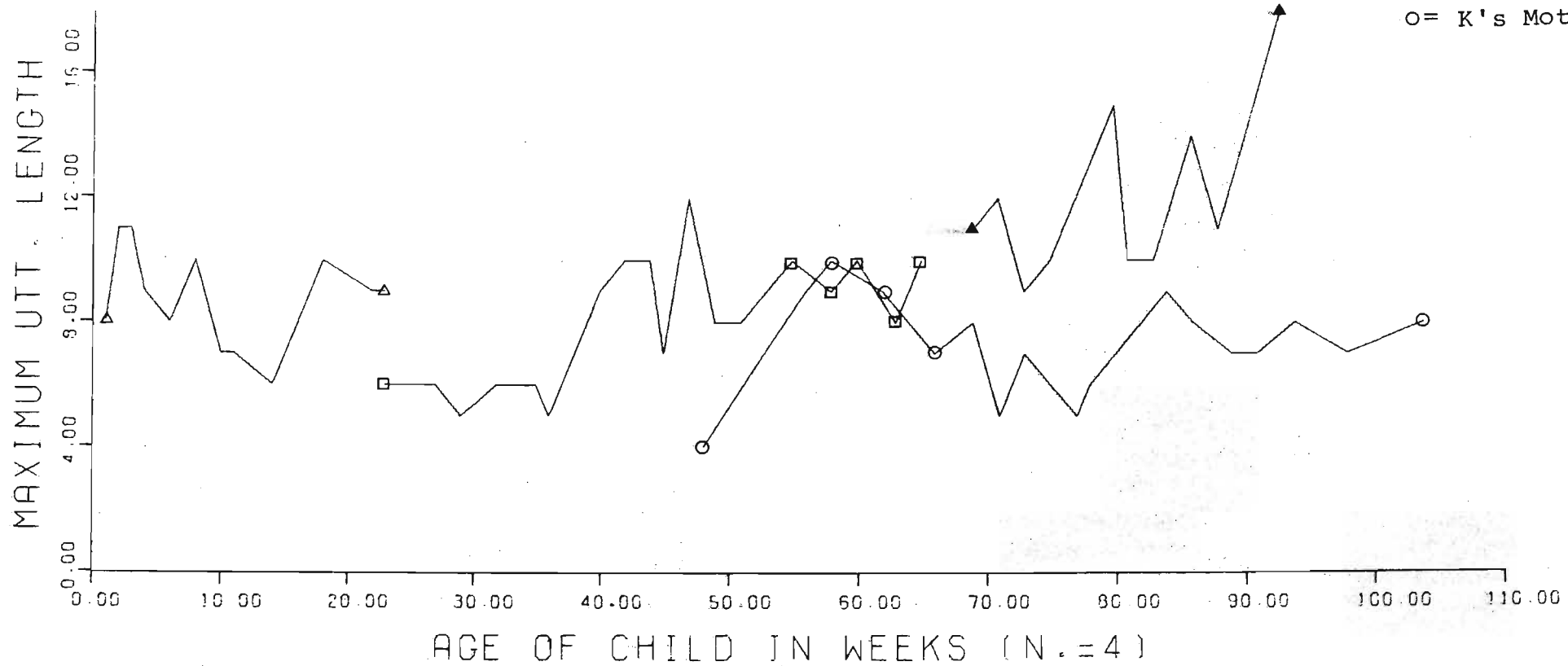
△ = J's mother
 □ = S's mother
 ○ = K's mother
 ▲ = O's mother



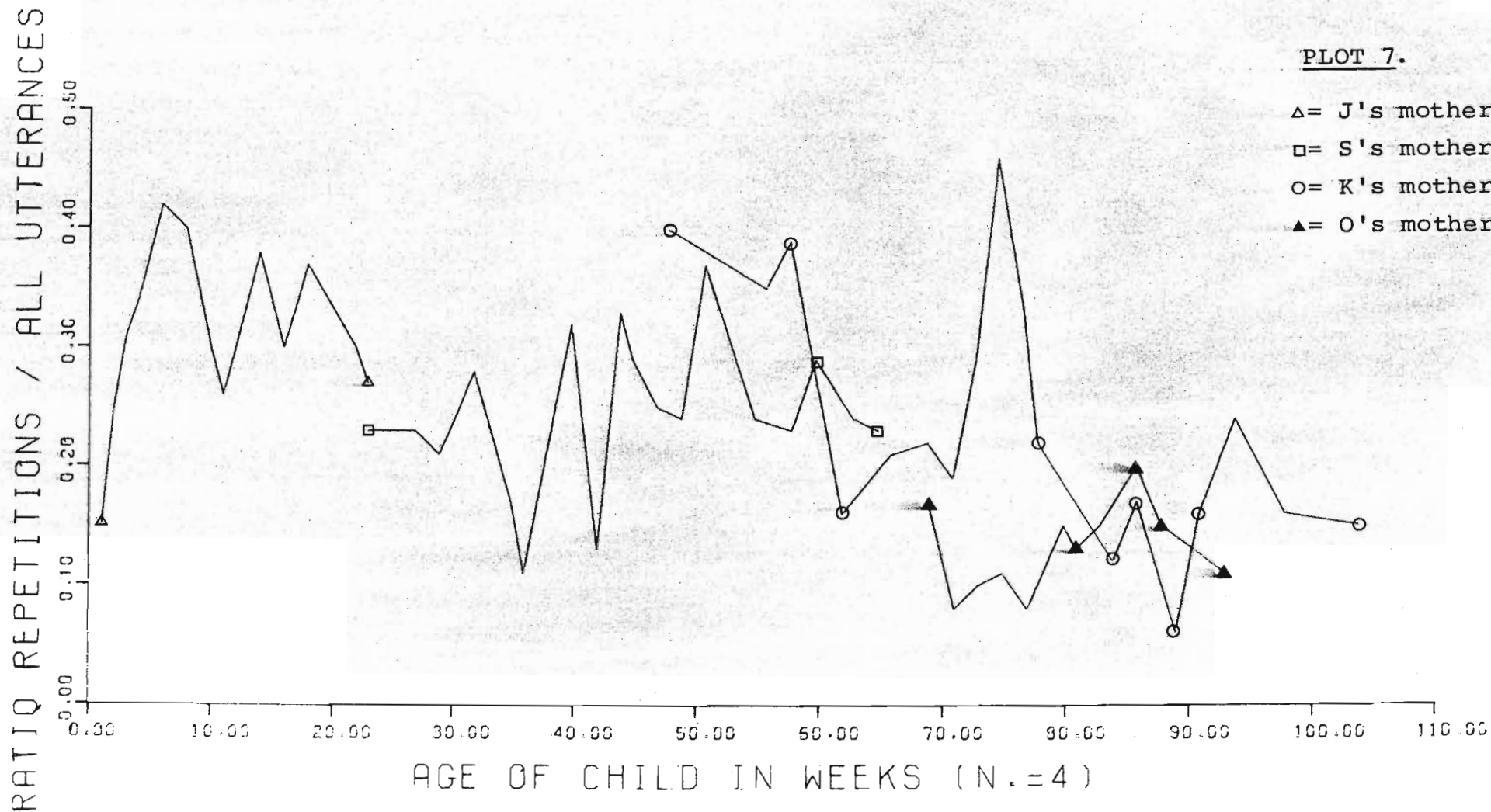
PLOT 6.

MAXIMUM UTT. LENGTH (N=4,492) VS. AGE OF CHILD

△ = J's Mother
□ = S's Mother
▲ = O's Mother
○ = K's Mother

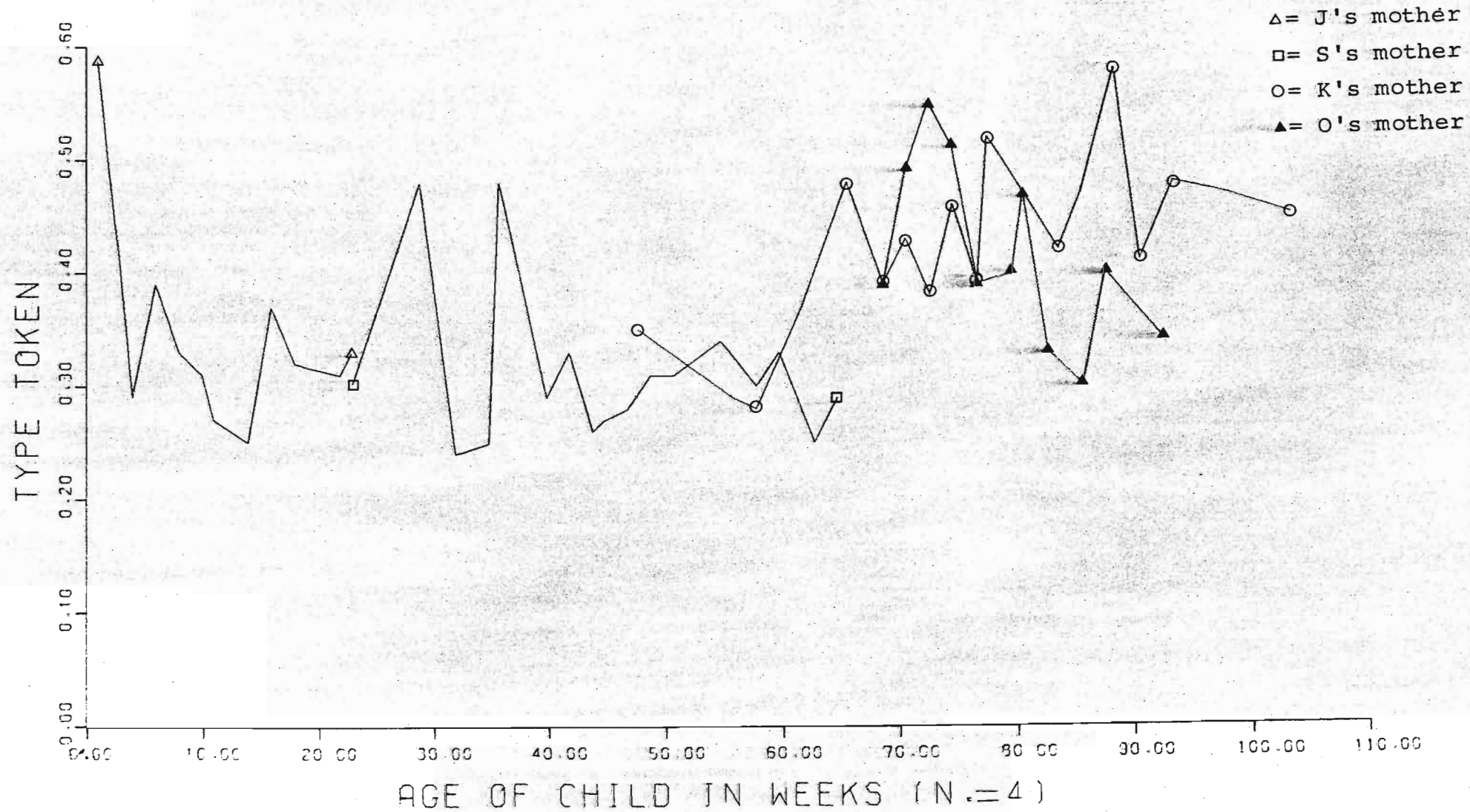


MOTHERS' REPETITIONS VS. AGE OF CHILD (N.UTT.=4,492)



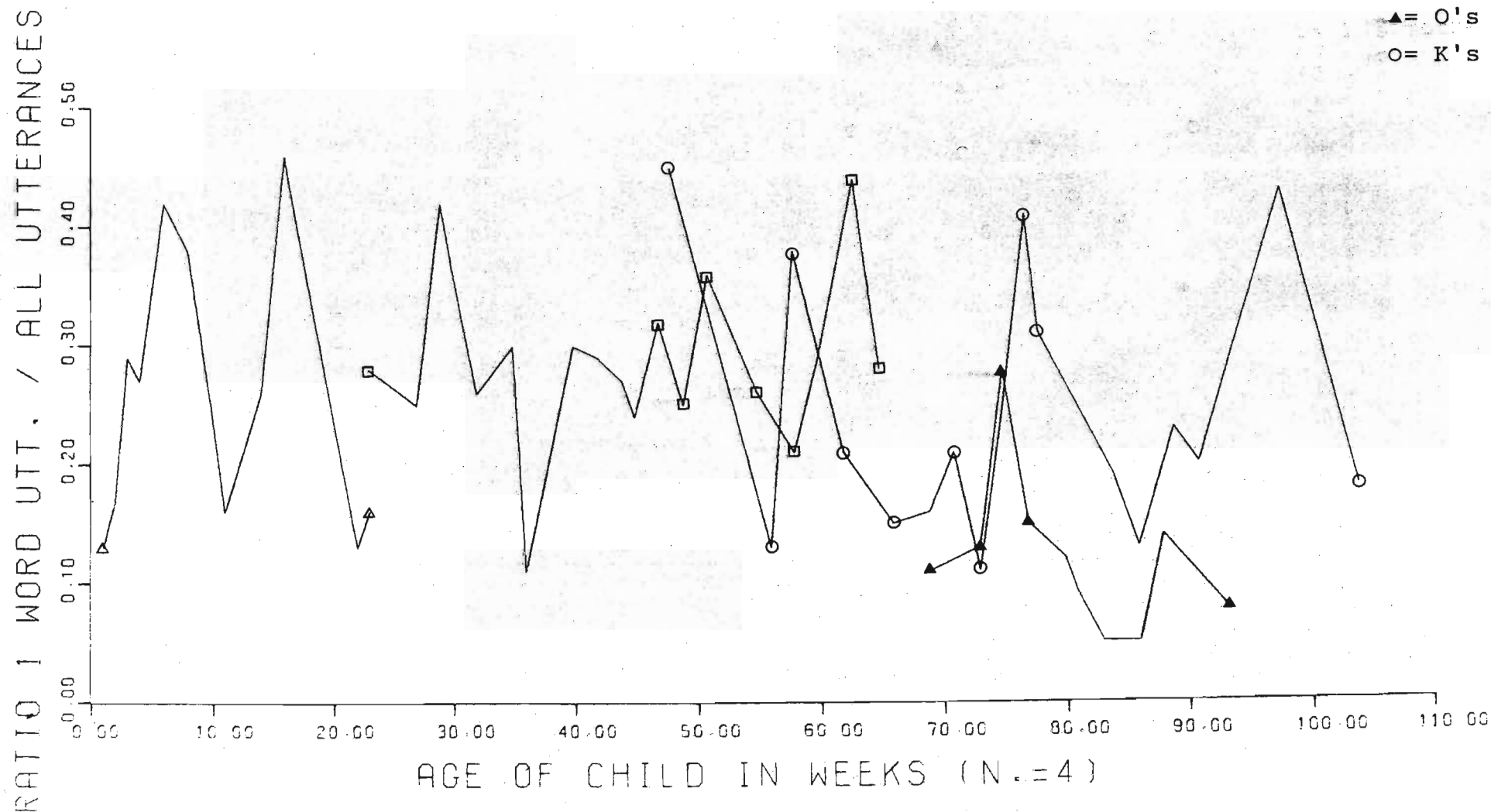
TYPE TOKEN RATIO VS. AGE OF CHILD (N.WDS.=13,241)

PLOT 8.



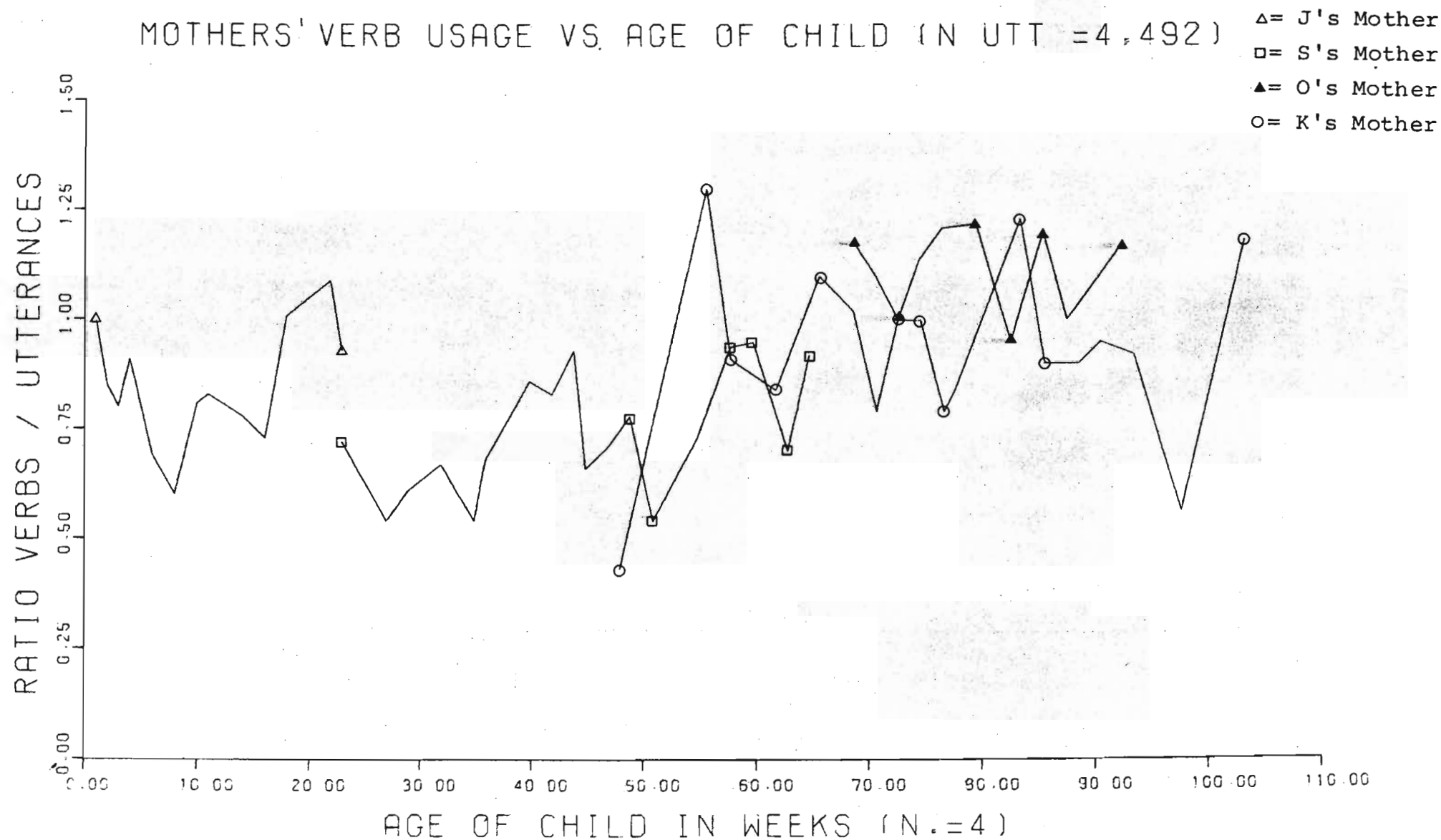
PLOT 9.

MOTHERS' 1 WORD UTT. VS. AGE OF CHILD (N.U.TT.=4,492)



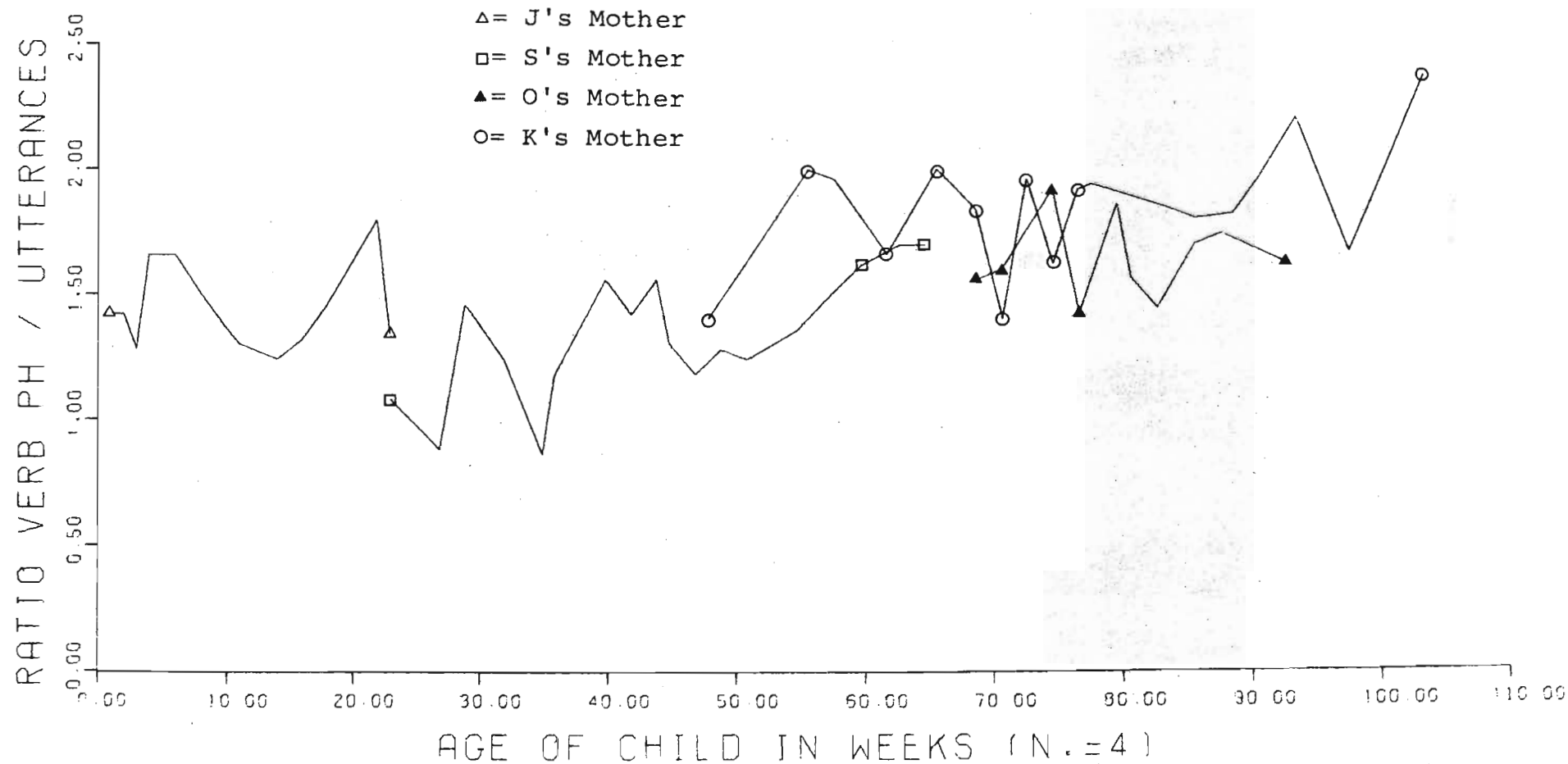
PLOT 10.

MOTHERS' VERB USAGE VS. AGE OF CHILD (N UTT = 4,492)



MOTHERS VERB PHRASES VS AGE OF CHILD (N 2WD UTT=3,405)

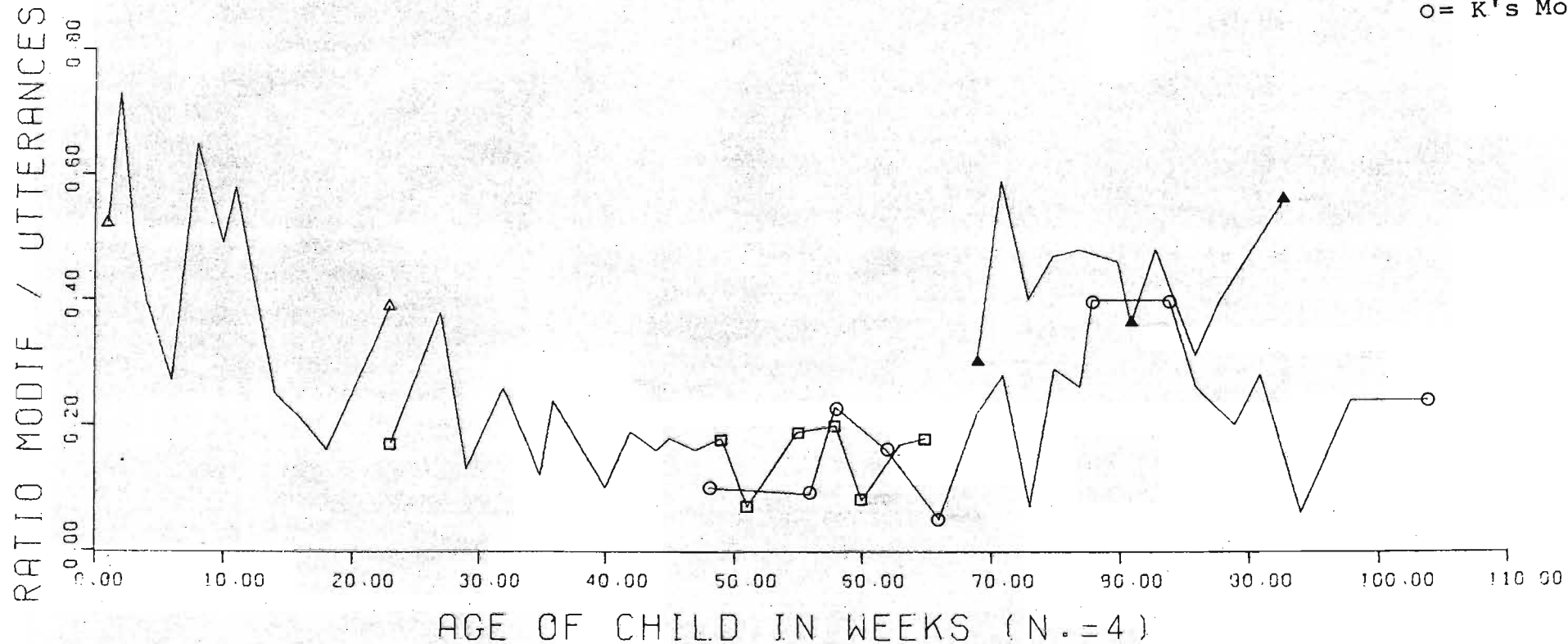
PLOT 11.



PLOT 12.

MOTHERS MODIFIERS VS AGE OF CHILD (N UTT = 4,492)

△ = J's Mother
□ = S's Mother
▲ = O's Mother
○ = K's Mother



PLOT 13.

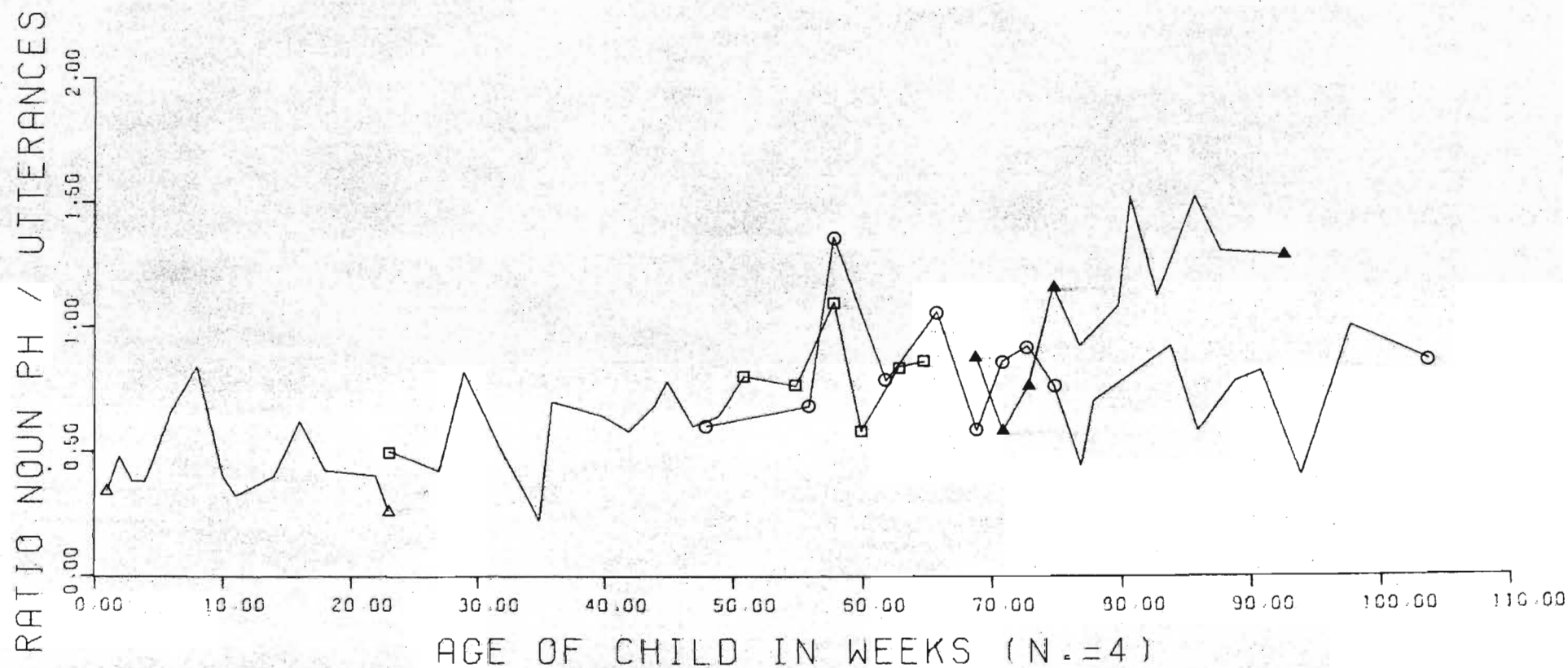
△= J's Mother

□= S's Mother

▲= O's Mother

○= K's Mother

MOTHERS NOUN PHRASES VS AGE OF CHILD (N 2WD UTT=3,405)



4.2.2.2. Conclusion.

To conclude on the trends which occur, it is noted that:

In Oliver's mother's speech significant positive trends emerge in the Number of Utterances and Words which the mother sends out to her child. This is also the case in the maximum utterance length and Noun Phrase usage by the mother. A negative trend emerges for this mother's Type Token Ratio score. Although other trends are suggested no other trends are significant in terms of what one would expect from a chance grouping of scores, i.e., fewer than half the measures (42%) show any change over time.

Kerryn's mother in her speech, yields a positive trend for Type Token Ratio and Verb Phrase usage. In her speech however, there is a significant drop in repetitions over time. Here only a quarter of the measures (25%) show any significant change as the child ages.

However, 67% of the measures used yielded significant trends in Sarah's mother's speech. All these trends are positive showing an increase in the Number of utterances and words to the child; an increase in MLU for all and two word or longer utterances; an increase in the Maximum length of the mother's utterances and finally an increase in Verb usage and Verb and Noun Phrase usage.

Julie's mother's speech shows trends similar to those of Oliver's mother's speech i.e., that the number of utterances and words to the child increase with time and that the Type Token Ratio measure significantly decreases with time. In this mother's speech, however, Modifiers are used less as the child ages. Here too, as with Oliver's mother, only 42% of the measures show any change over time. The Chi-square analysis presented in Table 23 (pg. 87) gives some support to the Pearson Product Moment trends discussed and suggest other weaker trends. However, the Pearson Product Moment measure is the measure referred to throughout this discussion.

The lack of trends in three of the mothers' speech may be partially explained by the fact that large differences in scores between each mother's sessions occur, which may obscure long term trends.

Once more a plausible explanation for the change in a large proportion of the measures in Sarah's mother's speech is Phillips' (1970 a and b) 'floor' hypothesis; that this mother's speech covers the period of greatest change. Despite a fairly large fluctuation between sessions, the plots for this mother's speech show an increase and a levelling about 52 weeks of age. This is insufficient to support the 'floor' hypothesis. For this to be the case, a number of negative trends should be found in Julie's mother's speech which, as may be seen from Table 22 (pg. 86) does not occur.

The view that a child's cognitive capacity is important to its linguistic development is clearly stated in van der Geest (1974). From this empirical study, van der Geest (1974) concludes that:

'the child's acquisition of syntax derives from two different sources : his own cognitive semantic abilities and his mother's 'intelligent' provision of syntactic information about how to express his progressively more complex ideas.' (pg.175).

It is suggested that the origin of such behaviour is at about the first year of life, when the child begins to make 'intelligent' use of the world. This mastering of the concept of an object (in Piaget's framework) is the beginning of representational thought in the child, which facilitates the development of language.

Snow (1975) points out that changes in mothers' speech as measured by MLU, as well as other features of mothers' speech do not show an abrupt change when children begin to speak, but occur at about 7 months of age. Snow suggests rather that:

'It is the children's ability to play a role in the social interaction by responding to adult speech with vocalizations and communicative acts which influences the mother's speech'. (Snow (1975)pg. 1).

Unfortunately because of the limited overlap in the sample used at 7 months of age, it was not possible to focus on this period in detail. However,

Julie's mother's speech is difficult to explain for on the one hand, it is simpler than the older children's mothers' speech and yet it does not appear to be about to change, as suggested by the trend analysis.

4.2.3. Mothers' Views

Mothers are unsure as to precisely when their children understand their speech. However, their views give a rough indication. In an earlier project (1975) by interviewing a sample of mothers, I found that they felt their children generally 'understood' them at 7 months of age (range 4 - 10 months). However, they also stated that a more 'complex' level of understanding was achieved by the child at about 12 months (range 10-16 months). The 'complex' level included fairly long utterances to the child. Important factors reported as associated with this understanding, were the mothers' tone of voice and her child's physical ability to respond appropriately to her messages. Mothers with children of seven months or below found it difficult to assess this concept.

4.2.4. Conclusion.

To briefly recap the issues involved in the study of mothers' speech, it is once more necessary to trace the development of this field. After Chomsky's outline of language severely challenged the behaviourist point of view, a large number of studies sought to examine the innate component of the Language Acquisition Device which Chomsky suggested. This innate ability

hypothesis was supported by the claim (among others) that speech to children, from which children formed their control of the language, was a:

'random, haphazard sample, in no way contrived to instruct a child on grammar'. (McNeill (1966) pg.173).

The innate ability to master language from a muddled example was also claimed by Bever, Fodor and Weksel (1965). These authors state that:

'there is little evidence that adults engage in a careful limitation of their linguistic output when conversing with children'. (pg.470).

This may have been the case in 1965 when the above statement was made, however, much work has been done since then challenging the 'innate' aspect of language acquisition. This is especially so of the view that the speech directed to the child is, for the most part, a muddled sample of language. Hence mothers' speech has been analysed to see if it does follow McNeill's (1966) or Bever et al's (1965) claims. The work done to date has also set out to suggest ways in which mothers' speech may facilitate a child's acquisition of language.

As has been presented so far, Mothers' speech to infants appears to be a simplified form of adult-adult speech. Not only do mothers use it to address their children, but so do non-parent adults. Shatz and Gelman's work (1973) goes on to suggest that even children modify their speech when addressing infants.

Clearly then, support has been generated for the view that mothers use a restricted, simplified and often repetitive speech style when addressing infants.

A second focus in this field is the relevance of mothers' speech to her child's language acquisition. For example, Snow (1974) notes the importance of the semantic content of mothers' speech, being limited to constructions which her child has already mastered. Also, Snow suggests that the simplicity and redundancy of mothers' speech:

'may primarily serve the purpose of minimizing confusion and helping to consolidate gains in language acquisition.' (Snow (1974 pg.16-17)).

A number of other workers have suggested that within this special speech, mothers are providing basic methods for learning the structure of language. Thus a simplification of speech seems necessary for any mastery of the system. A garbled mass of speech seems a totally inappropriate sample for a child learning language.

As has been seen in the trend analyses presented, mothers' simplification of speech to the level of their child's need, is more subtle than past authors seem to note. Few changes emerge within these mothers' speech over fairly long time spans. Therefore despite the speech being simpler on average, to suggest a constantly changing response to the child is not feasible, over the time span used in this work.

Only Sarah's mother's speech changes substantially in measures used. Here too, though, not all the measures show changes over time. It is essential to take the actual speech heard by children into account when attempting an analysis of the language acquisition process. The conclusion here seems to be:

'that these characteristics of the language input make it ideal as a data base for language acquisition and therefore help to explain how young children can master a large and complex system with relative speed and ease.' (Snow et al (1974) pg.1).

These authors go on to note, however, that to directly test this claim is difficult. The ideas presented here are merely what the research seems to indicate.

Reasons for the difficulty in testing the nature of speech to infants are noted in the problems inherent in the measures being used. For example, the concept of 'Complexity' in speech is very difficult to measure. In the following sentences, for example. I had tea in town; and I wish that I had had tea in town, the latter is obviously more 'complex' in terms of the message being expressed. The point here is : how could such complexity be measured? In breaking utterances into various units, as has been done in this and past work, only a crude segmented description of speech is achieved. No one set of measures describes

speech adequately and fully. For example, modifiers generally qualify a message, adding further information to it. But, simply counting all the modifiers which occur in a sample of speech, does not precisely measure the complexity of the utterances in which they occur.

The problem of measuring speech is worsened by the artificiality of the analysis, during which each utterance is removed from its context. The message content of the utterance is thus ignored and its relevance to the speaker's behaviour and the interaction at the time of speech is lost.

Furthermore, one has to guard against assuming that a syntactic analysis of complexity (even if it were complete) is tapping what is central to the linguistic development of the child. In all probability it is the semantic content of the speech which is of greater importance. The intention of a speaker, as conveyed in the function and force of an utterance, is the all-important complement to an adequate description of a communicative sequence. Therefore language in use will now be analysed.

4.3. PART 111. A FUNCTIONAL AND DESCRIPTIVE ANALYSIS OF MOTHERS' SPEECH TO INFANTS.

4.3.1. The Approach used.

This section attempts an analysis of the function of mothers' speech, the function being judged from each utterance in its context. Here the need to consider all aspects of communicative behaviour in the study of language is emphasised. This approach is used by Snow (1975) in her explanation of the need for modifications by mothers to their speech, when addressing infants. Snow's focus is on:

'the functional aspects of the maternal utterances and especially at the nature of the interaction.' (Snow (1975) pg.7).

4.3.2. A Functional Analysis of Mothers' Speech.

This includes all the speech from the four mothers in the sample. Only the Conative, Heuristic and Reciprocal functions are examined. The other Functions contributed little and occur infrequently in the mothers' speech. Note: a full definition of each function has been given in the Analysis of data section of this work. The reliability of assessing these messages has also been presented in that section.

In each session of Mother-infant interaction, mothers' utterances were judged in terms of the Functions used. Frequency counts of each function were converted to proportions of the total number of

utterances in each session.

A brief scan of the data for all mothers indicates that the Conative Function is used more in their speech than any other function and that Heuristic utterances appear more frequently than do Reciprocal utterances. However, it is the change over time of the different functions used by the mothers, when addressing their children, which is of most interest. To examine these changes, Pearson Product Moment correlations were performed.

4.3.2.1. The Conative Function in Mothers' Speech to their children.

(See Plot 18).

Here a count was made of the utterances in each session which satisfied the criteria of having a Conative function. This count was converted into a Ratio measure of the number of utterances in each session to make comparisons between different sessions possible. A negative linear trend emerges in the speech of the mothers of the older children. (Oliver and Kerry). i.e., in the speech of these mothers, fewer Conative utterances are used over time. No trend occurs in Sarah's mother's speech and a non-significant positive relationship is found in Julie's mother's speech.

TABLE 24

The Correlation of the Conative function in Mothers' Speech vs. the age of their child

CHILD	r value	Significance level
OLIVER	- ,728	P = ,02
KERRYNN	- ,543	P = ,02
SARAH	- ,05	non-significant
JULIE	,305	non-significant

4.3.2.2.

The Heuristic Function in Mothers' speech to their children (See Plot 19).

A similar procedure was followed here, as in the trend analysis of the Conative function i.e., a count of the Heuristic utterances used was converted to a proportion of all the mothers' speech in each 10 minute session. Here positive trends occur throughout the sample, all of which (except in Sarah's mother) are significant, i.e., this function plays an increasing role in mothers' speech over time.

TABLE 25

The Correlation of the Heuristic function in Mothers' Speech vs. the age of their child.

CHILD	r value	Significance level
OLIVER	,738	P = ,01
KERRYNN	,526	P = ,05
SARAH	,124	non-significant
JULIE	,61	P = ,05

4.3.2.3. The Reciprocal Function in Mothers' Speech to their children.

(See Plot 20).

Once more, the same procedure as before was used to analyse the Reciprocal utterances from each mother. Two positive but non-significant trends emerge in Kerry's and Sarah's mothers' speech. Two negative trends occurred in Oliver's and Julie's mothers' speech, the trend in Julie's mother being significant. This function does not seem to play an important part in mothers' speech.

TABLE 26

The Correlation of the Reciprocal Function in Mothers' Speech vs. the age of their child

CHILD	r value	Significance level
OLIVER	- ,327	non-significant
KERRY	,389	non-significant
SARAH	,36	non-significant
JULIE	- ,85	P = ,01

There follows a summary of the significant trends in the Conative, Heuristic and Reciprocal functions of the Mothers' speech.

TABLE 27

A summary of the trends in the three Functional measures of Speech, from all the mothers.

FUNCTION	OLIVER	KERRY	SARAH	JULIE
i) Conative	(* -)	(* -)	(o)	(+)
ii) Heuristic	(* +)	(* +)	(+)	(* +)
iii) Reciprocal	(-)	(+)	(+)	(* -)

Significant trends are indicated by an asterix and the direction of the trend e.g., (* +) or (* -). Non-significant trends are noted by the direction of the trend only e.g., (+) or (-) and no relationship between the variables of interest is indicated by zero (o).

Plots 14 to 17 present the Functional analysis of each of the four mothers individually. Here the inter-relationship of the functions within one mother's speech may be seen.

4.3.2.4. Chi-square test analysis of Functional trends in Mothers' speech.

As with the qualitative and quantitative measures presented earlier, a chi-square test was performed on the first and last raw data value of each function. This was done to supplement the

trends suggested by the Pearson Product Moment Analysis.

TABLE 28

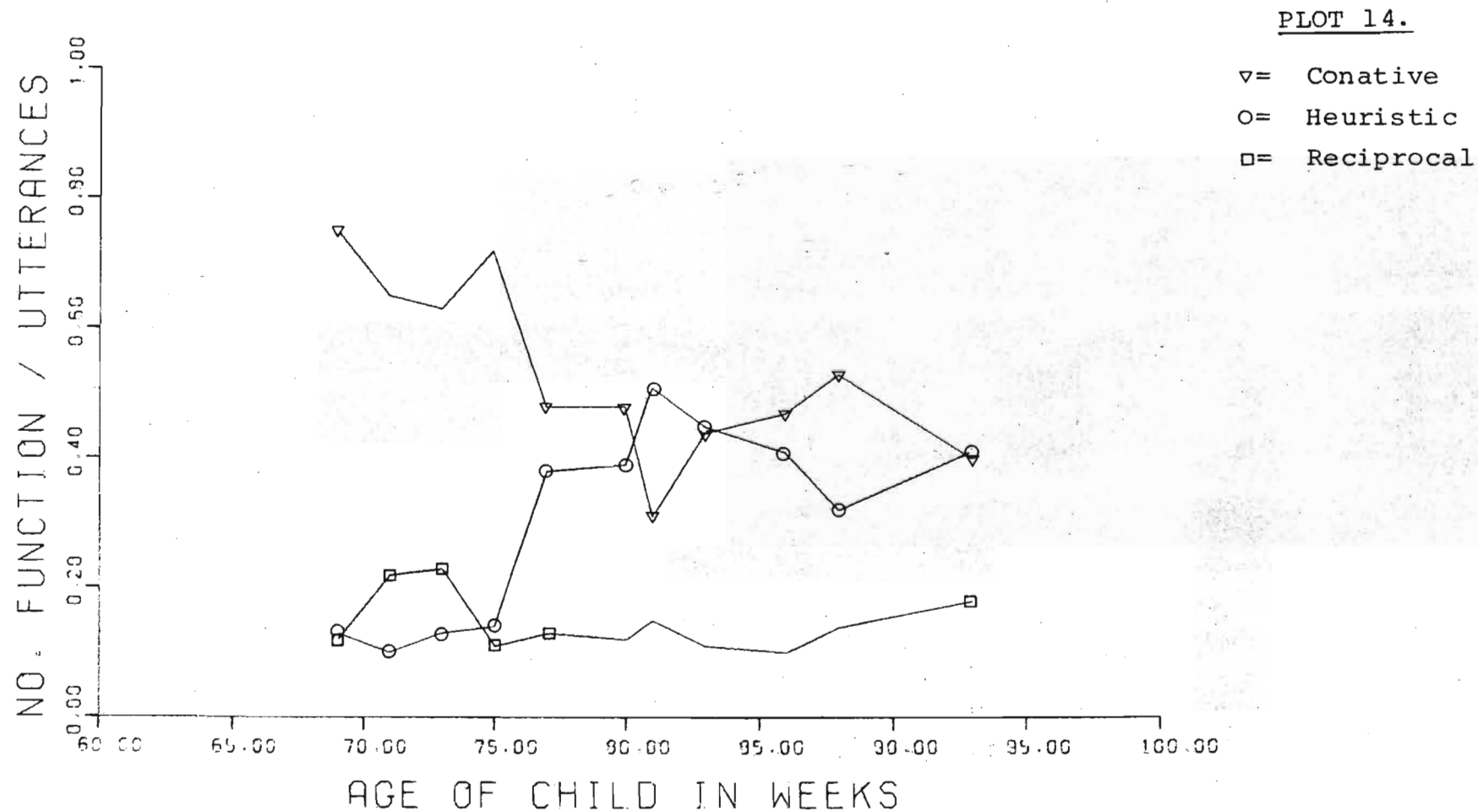
A Chi-square analysis of the three Functional Trends
in all the Mothers' speech.

MEASURE	OLIVER SCORES	KERRY SCORES	SARAH SCORES	JULIE SCORES
Conative	57-46	39-25	41-73	22-61
Chi	,96	2,64	** 8,42	**17,38
Heuristic	10,47	0-2	17-25	8-28
Chi	**22,72	,50	1,16	**10,02
Reciprocal	9-21	1-7	13-20	11-14
Chi	*4,02	** 3,12	1,08	,16

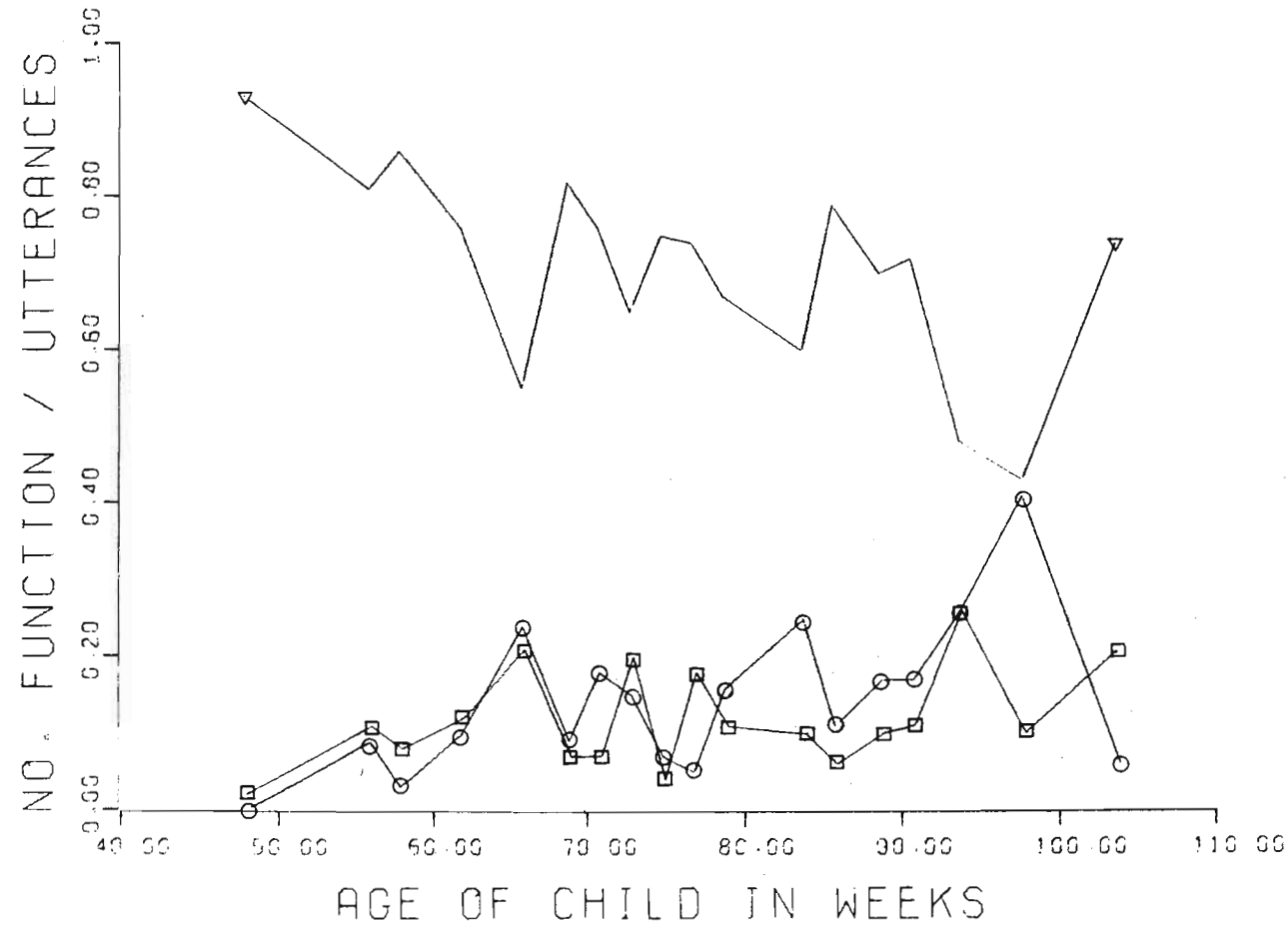
* = Significant to P = ,05 (All other Chi-square
 ** = Significant to P = ,01 values are non-significant)

In only taking data extremes into consideration, the chi-square test here is of limited use. Therefore the Pearson Product Moment analysis will be used in the Discussion.

FUNCTION OF MOTHER'S SPEECH- OLIVER (N.UTT.=807)



FUNCTION OF MOTHER'S SPEECH- KERRYIN (N.UTT.=819)



PLOT 15.

▽= Conative

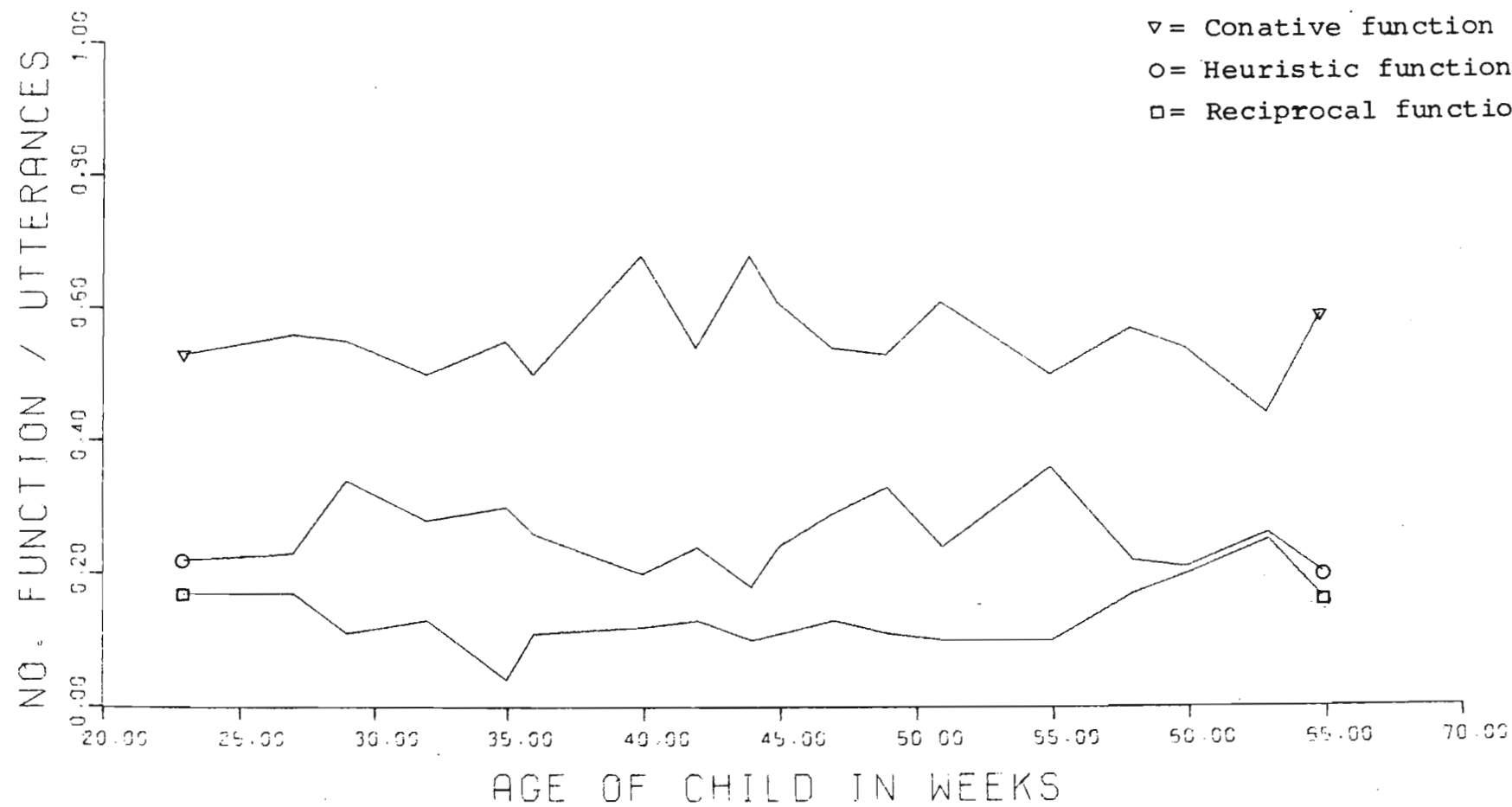
○= Heuristic

◻= Reciprocal

FUNCTION OF MOTHER'S SPEECH- SARAH (N.UTT=1,718)

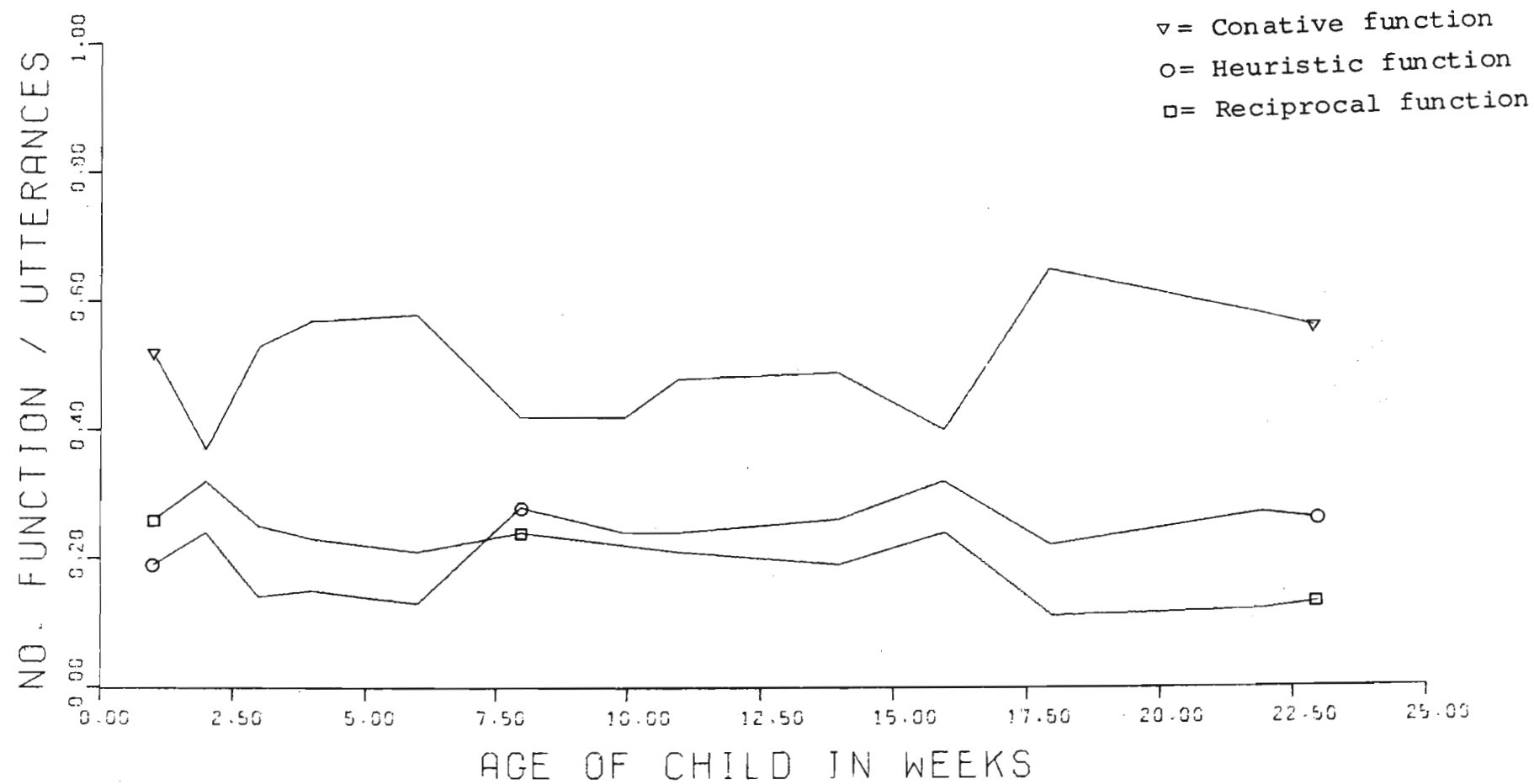
PLOT 16.

▽ = Conative function
 ○ = Heuristic function
 □ = Reciprocal function



FUNCTION OF MOTHER'S SPEECH- JULIE (N.UTT.=819)

PLOT 17.



PLOT 18.

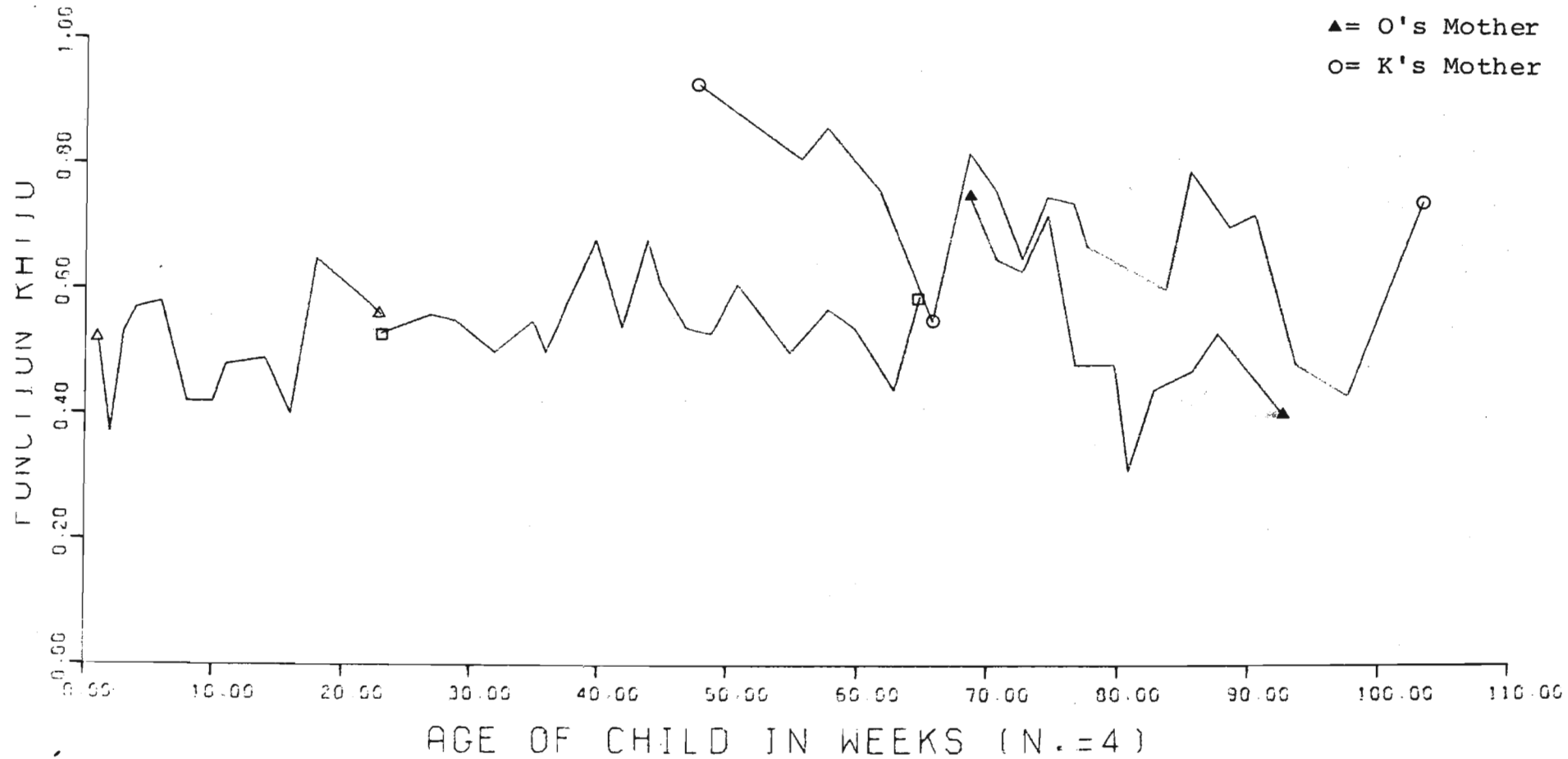
CONATIVE FUNCTION VS. AGE OF CHILD (4 MOTHERS)

△= J's Mother

□= S's Mother

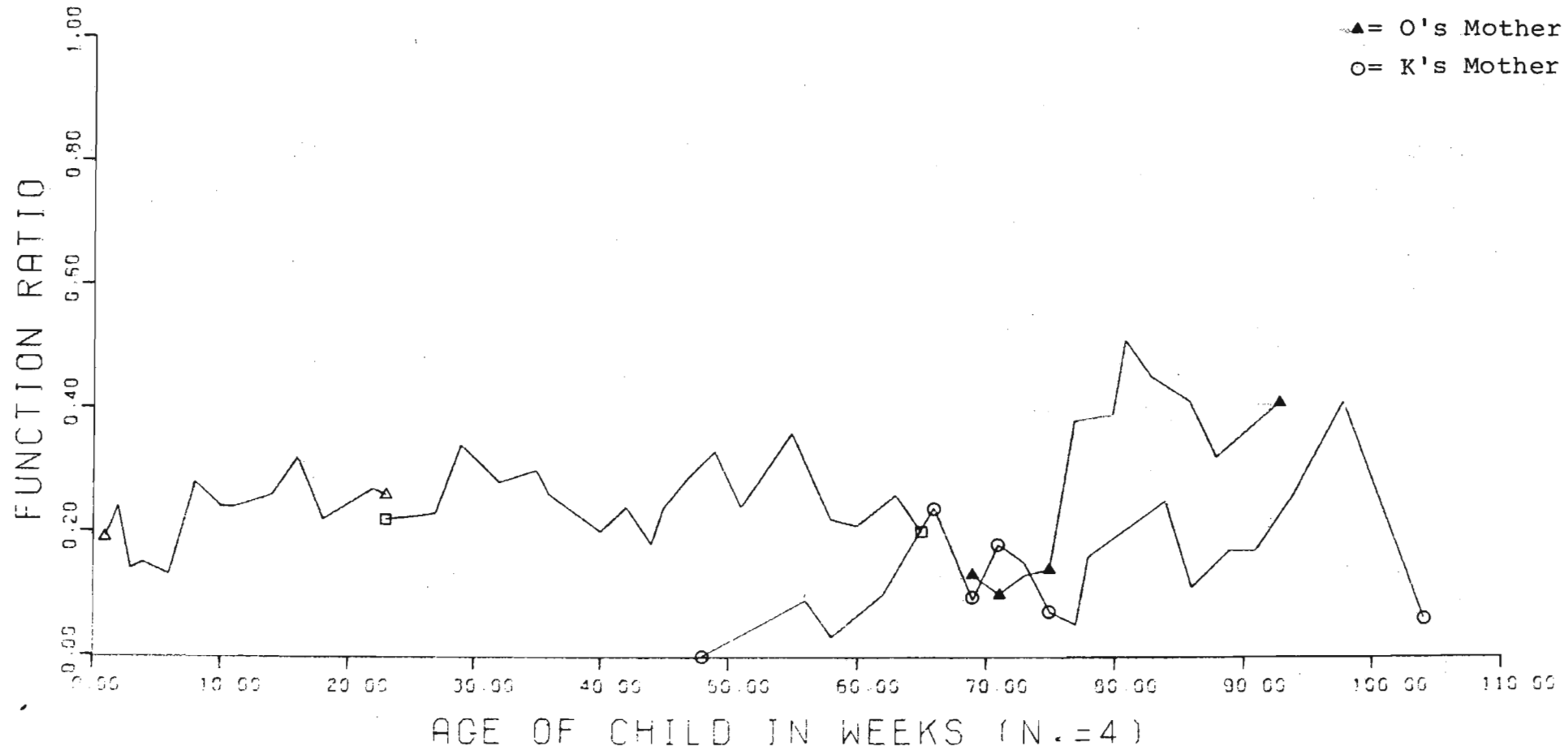
▲= O's Mother

○= K's Mother



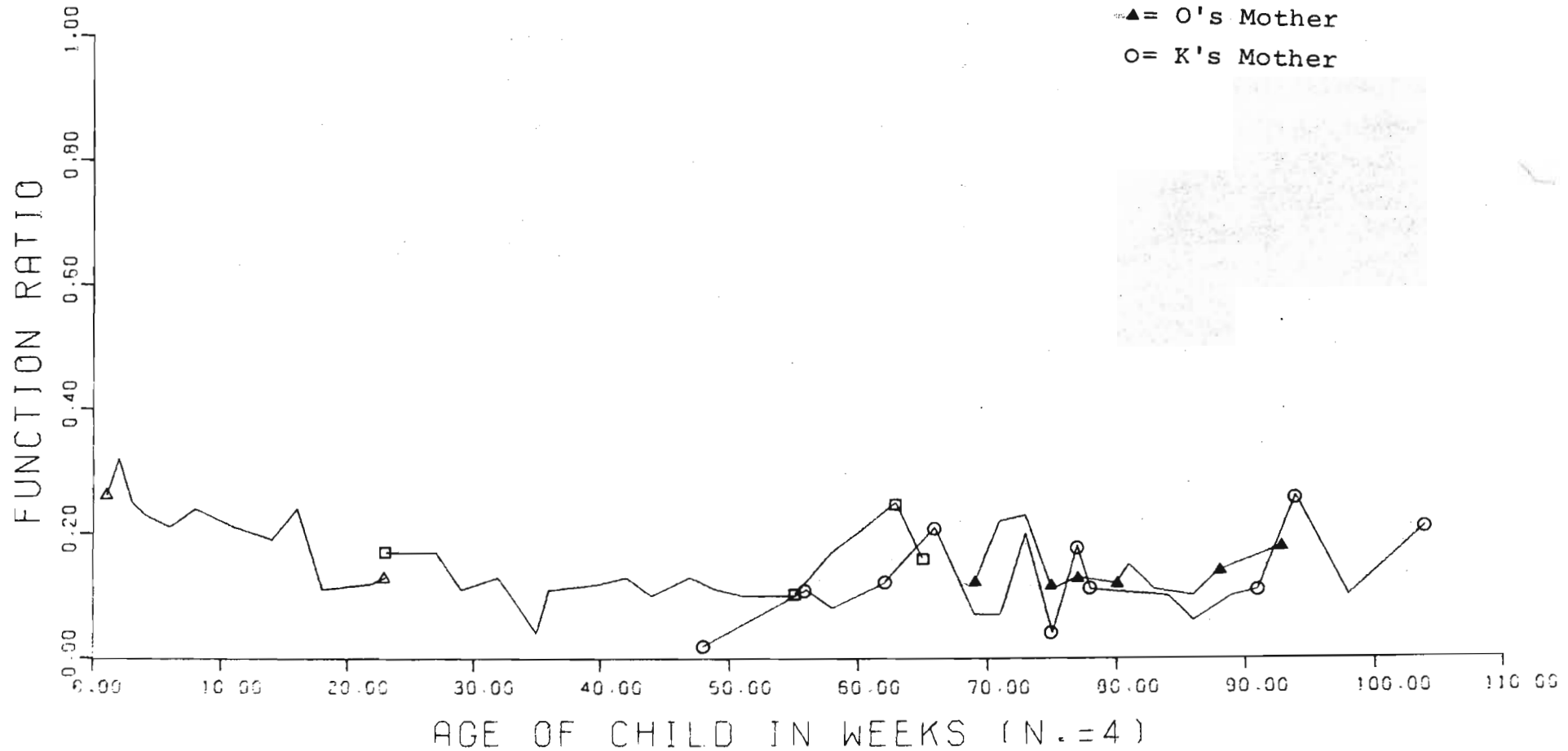
PLOT 19.

HEURISTIC FUNCTION VS. AGE OF CHILD (4 MOTHERS)



PLOT 20.

RECIPROCAL FUNCTION VS. AGE OF CHILD



4.3.2.5. Discussion.

The trends which emerge in Oliver's and Kerry's mothers' speech are fairly similar. These may be interpreted as a shifting in messages from being purely concerned in trying to elicit responses from the infant, to providing the infant with more information about the world. Here Conative utterances significantly decrease whilst Heuristic utterances increase over time.

However, the trends which emerge are not exactly duplicated. In Kerry's mother's speech, Heuristic utterances are used far less than Conative ones. Also this mother's Heuristic and Reciprocal utterances tend to hang together more and the reduction in Conative utterance usage is not as marked, as in Oliver's mother's speech. Thus although a significant decrease in the use of Conative utterances occurs in Kerry's mother's speech, it is still the most prevalent function. By contrast, there is a rather sharp decrease in Oliver's mother's use of Conative speech, which comes to equal her Heuristic speech.

In Sarah's mother's speech, none of the functions change significantly over the 42 weeks of

filming. The Conative function remains the dominant function with no change over time. Perhaps fluctuations which occur in this mother's speech tend to reduce the significance of possible changes. There is some similarity here to Kerry's mother in the hanging together of Heuristic and Reciprocal utterances. The function of Julie's mother's speech to her child soon after her birth is similar to that of Oliver's and Kerry's mothers' speech. The analysis of functional speech during this early period of interaction was performed as if the infant comprehended the speech. This was necessary as it reflected the mode of the mothers' speech. Without this viewpoint, messages in speech cannot be determined. Julie's mother decreases her use of Conative utterances over time. However, a marked increase in such utterances is anticipated at the time when the mother recognises understanding in her child. Unfortunately this has not been followed up due to insufficient data. This mother's Heuristic utterances show an increase over time, suggesting that increasing information about the world is being provided.

Julie's mother differs from the rest of the other mothers in her Reciprocal Speech. Earlier utterances are mainly a direct response to noises or actions from her child and are not found in older children's mothers. This tendency decreased sharply in time. The Reciprocal function only re-emerges once the older child

is capable of an active interaction with its mother. Then mothers respond to their infant's communications during joint activities.

This data analysis follows Snow's (1975) analysis of the communicative exchange fairly well. Here Snow registers dissatisfaction with the view that adults monitor their speech to maintain an optimal responsiveness from their children and stresses that this is not a complete explanation of what occurs. For example, the many questions addressed to very young infants are not explained by this view. Snow goes on to suggest that if linguistic cues from the infant were all-important, then speech from adults to infants would only occur at 12 - 14 months of age, the age when linguistic cues emerge from children. However, as Snow points out, mothers modify their speech at about the child's seventh month of life. Here, striking changes occur in what is being talked about. For example, a decreasing reference to the child is made and an increasing reference to the world. This point has been supported in the present study. Reciprocal utterances to Julie's behaviour sharply decrease whereas Heuristic utterances about the world increase. However, this occurs long before Snow's suggested seven months (28 weeks), namely at 18 weeks.

Snow's (1975) description of what mothers talk about at this period is interesting :

'The mothers were clearly 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.' (Pg.7).

This is the case in the speech of the mothers of the two older children. Here, as suggested by the increase of the Heuristic function, more information about the world is given to the child. Also, the reciprocal speech which does occur relates mainly to actions and objects.

For Snow, the most important change which emerges between a mother and her child is the 'conversational' turn-taking which emerges. In a similar way to Newson and Newson's (1975) analysis of the original of reciprocity, Snow (1975) suggests that:

'the interaction between these mothers and babies can best be described as conversational in nature and that the changes in the maternal speech results from the development of the baby's ability to take her turn in the conversation.' (Pg.7).

This outline of conversational interaction between mothers and infants is presented later.

4.3.3. A Description of the messages mothers send to infants.

The task of this analysis was to describe each utterance from the mother in terms of the 24 Glosses

presented in the Method of Analysis (pg. 50). Each function is examined separately to see what messages emerge from the mother to her child and whether these messages change over time.

In this section each mother will be discussed separately and then the mothers will be compared. Each mother's speech was firstly rated in terms of the 24 message descriptions. This count was then converted into a ratio of all the messages in the session. The ratios were then examined to see which occurred over time.

4.3.3.1. Oliver's Mother.

4.3.3.1.1. Conative speech.

Oliver's mother's Conative speech yielded messages as follows.

Rank Order Number and Description of Gloss.

1. (24) Requesting information e.g., 'What have you got.'
2. (11) Command to act. e.g. 'Put it on your head' and
3. (10) Requesting an action e.g. 'Look, try and put this one back.'

These occurred throughout this mother's speech.

4. (19) Demanding attention e.g. 'Oliver.'
5. (7) Comment on an object e.g. 'See the motor car?'
- (8) Locating an object e.g. Example as for (7) but with a point from mother.

- (14) Instructing how to act e.g. 'It's this one first'.
6. (18) Comment on own action e.g. 'I'll hold it now try and put it on.'
7. (1) Requesting an object e.g. 'Can I have the hammer please?'
- (3) Offering an object e.g. 'Here's another one.'
8. (4) Accepting an offered e.g. 'Can I have it?' object. (on being given object by the child).

From Rank 6 above, the messages listed occur seldom.

Note in the tables of Glosses, some glosses occur in the same Rank Order.

It should be noted also that multiple glosses do occur. Therefore the ratio of glosses, on which this discussion is based, was calculated using the total number of utterances she used.

4.3.3.1.2. Heuristic Speech.

Rank Order.	Number and Description of Gloss.	
1.	(7) Comment on object.	e.g. 'It's a lovely one' and
2.	(6) Labelling an object	e.g. 'That's a dog'.

These occur throughout this mother's speech.

Other messages which occur less often are:

Rank Order Number and Description of Gloss.

- 3. (18) Comment on own action;
- 4. (8) Locating an object;
- (14) Instructing how to act;
- (24) Requesting information;
- 5. (4) Accepting an offered object;
- (10) Requesting an action;
- (15) Demonstrating an action;
- (16) Scaffolding;
- (17) Comment on partner's action.

Here from 4, the messages listed are rare.

4.3.3.1.3. Reciprocal Speech.

Finally, in this mother's Reciprocal speech

Rank Order Number and Description of Gloss.

- 1. (17) Comment on partner's action e.g. 'That's
right' and
 - 2. (20) Expressing approval
- occur throughout.

Other messages were:

Rank Order Number and Description of Gloss.

- 3. (24) Requesting information;
- 4. (7) Comment on an object;
- 5. (4) Accepting an offered object;
- (14) Instructing how to act;
- 6. (21) Expressing disapproval;
- 7. (6) Labelling an object;
- (10) Requesting an action;
- (11) Command to Act;
- (23) Initiating an action.

As in Conative messages, here from 5, the messages listed are rare.

In this mother's messages, Requesting information, Command to act; Commenting on and Labelling objects and Demanding attention most frequently occur. However, her messages cover a large variety with usually fourteen different types per session.

4.3.3.2. Kerry's Mother.

4.3.3.2.1. Conative Speech.

In Kerry's mother's speech, for Conative utterances, the following messages occur through her speech : (11) Command to act; (24) Requesting information (second in rank).

Rank Order Number and Description of Gloss.

- 3. (16) Requesting an action;
- 4. (19) Demanding attention;
- 5. (1) Requesting an object;

which all occur fairly regularly, followed by

Rank Order Number and Description of Gloss.

- 6. (8) Locating an object;
- 7. (3) Offering an object;
- 8. (7) Commenting on an object;
- 9 (18) Commenting on own action.
- 10. (4) and (5) Refusing an object; (14); (15);
(21); and (22) Expressing sympathy.

which seldom occur.

4.3.3.2.2. Heuristic Speech.

In Kerry's mother's Heuristic speech, the following messages occur: (7) Comment on object (Rank 1) throughout the sessions, except Session 1 where no Heuristic utterances occur; this is followed by (6) Labelling an object (Rank 2). Other messages were:

Rank Order Number and Description of Gloss.

3. (8) Locating an object;
4. (18) Comment on own action;
5. (14) Instructing how to act; with
6. (15) and (17);
7. (24);
8. (11) and (16) (occurring seldom from Rank 6).

4.3.3.2.3. Reciprocal Speech.

To conclude Kerry's mother's speech description, her Reciprocal utterances included the following messages throughout the sessions : (17) Comment on Partner's action (Rank 1). This was followed by:

Rank Order Number and Description of Gloss.

2. (4) Accepting an offered object;
3. (24) Requesting information;
4. (20) Expressing approval; with
5. (5) and (22); and
6. (1); (11) and (23) occurring rarely.

As in Oliver's mother's speech, Command to act, Requesting information, Commenting on and labelling objects are the most frequent messages used.

4.3.3.3. Sarah's Mother.

4.3.3.3.1. Conative Speech.

Sarah's mother's Conative speech contained the following messages (11) Command to act occurred with greatest prevalence in Rank 1, followed by (24) Requesting information (Rank 2) and (19) Demanding attention (Rank 3). All three occur throughout this mother's speech.

In Rank 4, (10) Requesting an action, followed by Rank 5 (3) Offering an object are fairly constant in this sample. (7) Comment on an object and (1) Requesting an Object (both Rank 6) occur fairly frequently. These are followed by : (14) and (18); (8) and (17); (4); (6) and (21); (15) and (22) all at Rank 7, and occurring rarely.

4.3.3.3.2. Heuristic Speech.

In this mother's Heuristic speech (6) Labelling an object (Rank 1) and secondly (7) Comment on an object (Rank 2) occur throughout.

Rank 3, (24) Requesting information, followed by (17) Comment on Partner's action (Rank 4) occurred fairly regularly. (11) Command to act and (18) Comment on own action (both Rank 5) occur in half the sessions followed by: (19) and (22); (8); (4) and (10) (all at Rank 6).

4.3.3.3.3. Reciprocal Speech.

In Sarah's mother's Reciprocating utterances, the most common message is (17) Comment on Partner's action, which occurs throughout her speech. (24) Requesting information occurs at Rank 2 with some regularity. These are followed by (11) Command to act (Rank 3) and (23) Imitating an action (Rank 4) and (20) Expressing approval (Rank 5) with: (7) and (21); (19); (10); (6) and (18) (all at Rank 6) occurring seldom.

Once more, (11) Command to act and (24) Requesting information plus Commenting on and labelling objects, form the most frequent messages used. Hereto a large range is found, of about 15 different messages in each session.

4.3.3.4. Julie's Mother.

The messages in Julie's mother's speech are now presented. Afterwards, a combined table will present the Rank Order of messages from all mothers.

4.3.3.4.1. Conative Speech.

In this mother's Conative speech (11) Command to Act and (24) Requesting information both occur at Rank 1 throughout the sample. Rank 2 (19) Demanding attention, which also occurs in all the sessions and at Rank 3 is Gloss (10) Requesting an action. These are followed by: (3); (4) and (7) and (17) and (22) all at Rank 5 and occurring seldom.

4.3.3.4.2. Heuristic Speech.

In her Heuristic utterances (17) Comment on Partner's action occurs in Rank 1. (18) Comment on own action is at Rank 2 and occurs in nearly all the sessions. At Rank 3, both (7) Comment on an Object, (24) Requesting information and (6) Labelling an object appear with:

(8); (14) and (22); (4) and (10) and (15) and (16) (all at Rank 4) occurring seldom.

4.3.3.4.3. Reciprocal Speech.

In her Reciprocal Speech, Julie's mother uses (17) Comment on Partner's action (Rank 1) throughout the sessions. This is followed by (24) Requesting information. At Rank 3 both (20) Expressing approval and (22) Expressing sympathy occur. These in turn are followed at Rank 4 by (11); (18); (21) which occur rarely.

4.3.3.5. The Sample.

Differences between the mothers will now be presented in a summary of apparent trends.

In Conative utterances, all mothers send the following messages to their children : (11) Commands to act; (23) Requesting information; (19) Demanding attention and (10) Requesting an Action. Kerry's mother requests objects and Sarah's mother verbally offers objects more frequently than the other mothers. It is important to note that Oliver's and Kerry's mothers decrease their usage of this type of speech over

time, whereas the other two mothers show little such change.

In their Heuristic utterances, mothers' messages are as follows: (7) Comment on object and (6) Labelling an object are most common. Questions and locating objects also occur fairly frequently. Julie's mother differs from the other mothers, in predominantly commenting on her child's action (17). This is also evident to some degree in Sarah's mother's speech. At an earlier stage in the child's development, mothers seem to focus more on their child's behaviour and at times, each movement it makes. In speech to older children, on the other hand, an increased focus on objects is evident. This fits Snow's (1975) idea that the mother focusses more on her child early in development. Objects about the child only form a focus of attention as the child grows older.

In their Reciprocal speech, all the mothers comment on their child's actions (17) most frequently and also often ask questions. Expressing approval and accepting offered objects also occurs. However, it is important to note the comparative lack of Reciprocal speech from mothers. This is probably due to the mothers simply responding to their children without necessarily verbalising these responses. The Reciprocal speech which does occur, changes little over time.

The following table presents the speech to children from each mother in different functions.

TABLE 29

A Summary of the Occurrence of Different Messages in
All Mothers' Speech to their infants.

N.B. Functions are separate.

	Constant	frequent	moderate
<u>Conative</u>			
OLIVER	24; 11; 10	19	(7; 8; 14)
KERRY	11; 24;	10; 19; 1	8; 7; 3;
SARAH	11; 24; 19;	10; 3	7; 1
JULIE	11 & 24; 19;	10	-
<u>Heuristic</u>			
OLIVER	7; 6;	-	18;
SARAH	7;	6; 8;	18; 14
SARAH	6; 7;	24; 17;	(11; 18)
JULIE	17;	18; 7;	24; 6;
<u>Reciprocal</u>			
OLIVER	17; 20;	24;	7;
KERRY	17;	4;	24; 20
SARAH	17;	24;	11; 23; 20
JULIE	17;	24;	(20; 22)

Note: Brackets () indicate an equal rate of occurrence for the message numbers within them.

The lack of variation in the messages used throughout the sample is interesting ie., the type of message mothers send to their children is fairly constant despite age differences in the children. The only exception is in Julie's mother whose speech is mainly concerned with the child and its behaviour.

4.3.4. Comments on Objects and Request for Actions.

Another two features of mothers' speech examined were (i) the variation of objects which mothers commented on and (ii) the variety of actions which children were asked to perform over time. Here only different objects were counted, although several references to an object may be made in any session.

(i) Using a content analysis of mothers' speech during each 10 minute session, it was seen that object references are almost lacking in Julie's mother's speech. As expected, this mother did not discuss objects as she felt that her child did not yet understand her. The first object this mother referred to : pin (at two weeks) is mentioned while the mother talked to herself. Labelling objects was scarcely observed. Only single occurrences of : light : (at 4 weeks); bath and panty-hose (at 10 weeks) and nappy (at 16 weeks) occurred. Also, no reference to absent objects was made. Instead, the mother made numerous references to the child's body e.g., thumb, head and hand (in week one) legs (in week two) face (in week three). Pet names e.g., pig (in week 1) and worm and tick (in week 8) were also noted. Only at about Julie's 18th week are objects referred to by name e.g., doll and later on, hat, chicken and dog as well as the child's mouth and teeth. This brief variety of references was unique to this mother.

Sarah's mother made comments on objects to her

child at 23 weeks e.g., teddy, lights, doll and dog. The frequency of object reference in this mother's speech increases as follows. 5 object references per session occurred until the child's 42 week. After this time, about 8 objects per session were commented on and by the end of filming (at 65 weeks) 12 different objects are referred to. However, references to the child or its body were not made.

Kerryn's mother referred to three objects per session until her child was 60 weeks old. After this, an average of five different objects of reference occurred until the end of filming (at 104 weeks).

Oliver's mother's speech to him at 69 weeks is similar in object reference to Sarah's mother's speech to Sarah at 65 weeks. About 9 objects are commented on throughout the filming. This reached a maximum of 16 different objects per session at the end of filming (at 93 weeks).

Hence a fairly large variety of objects are commented on, or referred to, by the mothers. This variety expands in the speech of mothers of older children and is probably a response to their child's growing awareness of the world and linguistic awareness.

ii) Examining the mothers' instructions to act yields a similar increase in variety over time as their object references. Julie's mother does not request actions from her child. Sarah's mother only asks her child to perform actions at 42 weeks of age. After this, Sarah's

mother gives on average seven instructions per session to her child. This peaks at 65 weeks when 11 instructions per session are given. Kerry's mother gives an average of five instructions per session to her child with slightly more (6) after 77 weeks. Oliver's mother's speech at the beginning of filming (69 weeks) is similar to Sarah's mother's at the end of her tapes (65 weeks). Oliver's mother gives eight instructions on average with a peak of 11 at 86 weeks.

Shared commands to infants for actions by the three mothers were : give; come; look; put; throw; pull; say; kick; show; fetch and build. Two of the mothers gave go; clap hands; turn; play and pick up.

It appears therefore that comments on objects and instructions to act are only given to children at about 42 weeks (10 months). These maintain a fairly steady level, tending to reach about one a minute as the child grows. However, situational and mood factors which the mother detects in her child are also important, accounting for much of the variation between sessions.

4.3.5. 'Conversational' trends in Mothers' speech.

The final section to this discussion will focus on the 'conversational' analysis used by Moerk (1972 and 1974) and by Snow (1975 and 1976). This is a useful approach and may help overcome some of the difficulties of analysis.

Snow (1975) outlines the progression of mother-child interaction in terms of turn-taking behaviour. Examples will be from the corpus of speech used in this study which match Snow's outline. Snow's aim is to illustrate that modifications in speech are to be seen in terms of the nature of the interaction which a mother shares with her child.

The outline is as follows:

At three months (i.e. 12 weeks) mothers use speech in their conversations with infants. The infants however, use smiles, babble, burps etc. As Snow points out:

'any of these baby-unit types (turn taking) seemed to function as the first half of an adjacency pair, in that mothers never failed to respond to them'.
(Snow (1975) pg. 9)

Examples from Julie's mother's speech are:

<u>Mother</u>	<u>Julie</u>
No you don't	(Cries)
I'm so sorry for you.	
	(wakes)
Hello my baba	
Did you wake up?	

However, with cries, as Snow points out, turn taking is not usually evident. It seems at 12 weeks that the mother is framing the child's sounds, etc., into a turn taking sequence.

At seven months (28 weeks) here the child's turn taking or response eliciting behaviour had to be 'high quality' (Snow's term) before the mother will react. However, children are still very poor at turn taking and are primarily shaped into such a role by mothers.

Examples from Sarah's mother's speech are:

Mother

Sarah

(cries sharply)

Are you getting cross?

You getting cross?

dg @

(repeats sound several times)

Sarah's actions are also important here:

(stands)

Oh, you are a big girl.

At twelve months (48 weeks) babies respond more reliably to their mother's speech and initiate more by their own activities. Mothers now expand babbles rather than simply imitating them.

Examples from Sarah's mother again, are:

Mother

Sarah

dd dli

Dolly hmmm?

Duck

k d

duck.

Otherwise much of mothers' speech still responds to the child's behaviour e.g. 'Don't run or you'll fall' 'Are you trying to drink something?' or is involved in trying to get the child to perform an action or play a game.

At 18 months (72 weeks) the child takes turns by using words. Here as Snow points out, the mother expects the child to take turns and also to respond appropriately correcting the child if necessary.

Examples from Kerry's mother (at 84 weeks).

<u>Mother</u>	<u>Child</u>
	da
Hair	
	ka
No hair	
Who's that?	ð mi

That's not mummy.

and from Oliver's mother:

<u>Mother</u>	<u>Child</u>
Little one	
Hey (tickles O.)	
	ðð (harsh)
Sorry.	

and at 93 weeks:

Mother
What does the cat do?

Child

miəʊ

yes.

However, actions from the child are still important to the mother for determining an appropriate response. An example from Oliver's mother (at 80 weeks).

Mother
Where's the teddy bear?

Child

ʔ (with a point)

That's right.

Turn taking is fairly well developed at this stage. Although it is most clearly seen in book sequences, joint play has also been established at this point. Turn taking skills seem most important to the process of language acquisition. Snow (1975) feels that this process occurs as:

'mothers had from the beginning a strong conception of their babies as social beings with needs, intentions and interest in human adults'. (pg.21).

This statement is succinct in noting the influence of theories of social interaction, intentional behaviour and the need to communicate which were outlined in the Literature Review.

Snow (1976) follows her hypothesis up by analysing Mothers' conversations with their unskilled

partners. It is suggested here that adults match their speech to what their child intends to say, thus providing the child with a linguistic realization of its intentions.

Snow's (1976) conclusion on the function of questions in mothers' speech are that they:

'establish joint attention and.....confirm that experiences are being shared.' and that:

'By asking questions, mothers create situations within which their children can function as effective and informative conversational partners.'
(Snow (1976) pg.23).

Questions seem to be most frequently used to create such communicative contexts. This is probably the reason for their frequent occurrence in mothers' speech. There are employed in a number of ways to structure conversations as may be seen in some of the samples above.

Moerk (1972) analysing older children's interactions with their mothers presents a number of other devices which mothers use e.g., correcting and expanding the child's speech. Moerk (1972) suggests that:

'the repetition of the same situation and the accompanying phrases could provide an ideal ground for language learning of the child.' (pg.235).

In his 1974 paper, Moerk suggests that a combination of cognitive development in the child and the total situation forms the conversations which emerge.

Encoding is seen as most important and develops in the following way. First the mother encodes objects in the environment, then she prods the child with leading questions to encode e.g. 'That's a duck, what's that?' Finally the child encodes spontaneously.

Another point which Moerk makes and which is evident in mothers' speech is that:

'in a situation of close physical proximity and nearly continuous interaction, verbal behaviour can often approach a monologue form. As either partner is fully aware of the other's presence..... The adult.....consequently does know quite well what the child is about to do.' (Moerk (1972) pg.250-251).

Added to this, one should note that the adult expects the same from the child. This may be seen in the prolonged use of 'this'; 'that thing' etc., in mother's speech. Contrary to expectation, nouns are not often used to name objects. That is, during play or joint activity the mother seldom refers to objects being manipulated by name.

4.3.6. Conclusion.

In this Part, data has been presented which suggests that mothers' speech (to older children) changes in its basic function. The most prominent Conative messages to infants are Command to Act and Requests for Information from the child. However, in the older children's mothers' speech these decrease in importance over time. Comments on objects and labelling of

objects are the commonest Heuristic messages to infants. In the older children's mothers' speech these become more frequent over time. Only the youngest child's mother in her speech uses many Reciprocal utterances, where commenting on the child is most common. This also occurs in the other three mothers' speech, but the Reciprocal function is more limited. One should note the variety of messages which mothers use. As many as fifteen different messages occur in a 10 minute sequence of interreaction between the mother and her child.

Comments on objects and request for action become part of mothers' speech in about the child's 42 week. Before this period they are limited but increase rapidly to the rate of about one different object being commented on or one different action being requested per minute. (Here the diversity of requests of action rather than the volume is being commented on). Hence Conative requests for action, although decreasing over time include an expanding variety of actions. Heuristic utterances which comment on objects increase in both number as well as in the variety of objects being referred to.

Finally, conversational trends and the role of the mother in forming the child's role as a partner in communication was presented. This type of analysis is useful in postulating the role of mothers' speech to children as two-fold. Firstly in shaping turn-taking and secondly in providing simplified messages within a context to form a working example of speech for the child.

5.0 CONCLUSIONS OF THIS STUDY

In the first part of this study, the hypothesis that mothers' speech to infants is both simple and redundant, was upheld. This speech is characterised by short utterances; a limited vocabulary, few verbs or modifiers per utterance and few noun or verb phrases per utterance, as well as a high frequency of one word utterances and repetitions.

It was also found that the speech of mothers to older children appears more complex than that to younger children. The speech to a child of about a year appeared the most simple, which follows Phillips' (1973) 'floor' hypothesis.

On examining the trends which emerge in mothers' speech in the second part of this study, the idea that mothers adjust their speech according to their child's needs was not upheld. Few changes were observed in each mother's speech over time. Only Sarah's mother proves the exception. As the data on Sarah's mother covers Sarah's first birthday, once more support for Phillips' (1973) 'floor' hypothesis is suggested.

However, the overall lack of change in the other mothers' speech contradicts earlier work.

It is important to see what is being examined here. 'Complexity' of speech, which syntactic measures claim to examine, lacks reference to the child's

cognitive system. There is no indication that degrees of complexity are being measured at all. As Syntactic measures only give a crude indication of speech, conclusions based on such measures should be viewed with some caution.

The view that a child acquires language from a complex sample of speech by using an 'innate' ability is an insufficient account of the process of language acquisition. Thus the role of mothers' speech, other than supplying a simple language framework to children, has yet to be examined. Therefore the final part of this study analysed mothers' speech as part of an interacting communicative sequence. This was done by analysing (a) the intended effect of a mother's utterance on her child and (b) the content of the messages which she sent to her child.

It was found that mothers, in their speech, were mainly concerned with eliciting a response from their child. In the mother's speech to the two older children however, this aim decreased with time. In these two mothers Commands to Act; Request for information and Demands for the Child's attention decreased in their frequency of use as Comments on Object or Labelling Objects became more frequent in the mothers' speech. The mother of the youngest child, Julie, was the only mother to show a marked decrease in Reciprocal speech. This mother's early speech focussed most often on her child's action. This

Reciprocal function occurs in mothers' speech when the older child began to interact with its mother during joint play. It is important to note that the same messages took precedence throughout the sample of speech used and followed similar rank orders in the frequency of their use in all four mothers' speech. There is some variation in Julie's mother's speech. Added to this data is the observation that the variety of objects which the mother comments on and the range of actions she requests from her child are as follows. Few objects or actions are verbalized until the child is 42 weeks old. After this, messages are fairly varied with approximately one different object and action being commented on by the mother per minute of interaction. It was also found that although Commands to act decrease in mothers' speech to older children, the variety of actions which mothers request increases. Comments and labelling of objects on the other hand, increase, as do the variety of objects being noted.

This description of messages supports Snow's (1975) idea that the mother changes her speech in terms of content, to take her child's interest and needs for information into account. It also follows Piaget's (1970) outline of the development of representation and symbolism in the child, which is vital to the development of language.

Snow's (1975) Conversational trend analysis has been briefly presented as an illustration of a further method of analysing Mother-Child verbal interaction.

Although useful, this method still has to be fully formulated.

To date a fairly accurate description of mothers' speech has been achieved in terms of quantitative measures. However, these measures fail in artificially removing utterances from their context. Hence, a more complete description of the intention and message content of mothers' speech has been included into this study. This analysis, used within a Conversational approach, seems to be the most useful course at present.

It is also noted that a clearer understanding of the child's cognitive processes is necessary, before an accurate description of language acquisition is possible.

5.1. SUMMARY OF CONCLUSIONS.

Within the scope of the measures of speech used in this study, the following major conclusions emerge:

- 1) 'Mothers' speech to infants' as a blanket term does not seem valid, for each mother uses a different style of speech when addressing her infant. Broad labels of simple and redundant may be attached to speech addressed to infants, only when such speech is grossly compared to adult-adult speech.

2) Within the time span used (up to 56 weeks of age in this study) mothers do not significantly make syntactic changes in their speech, to suit their growing child's needs. However, the message content of their speech does change so that the speech style adopted by mothers is enriched by a large variety of messages sent to infants. It is the variety of message sent from mothers which, in expanding, seems to take the child's needs into account.

3) Work needs to continue to develop a method of analysis which gives the most precise description of speech for comparative purposes. Ideally this would combine both the syntactic and the semantic aspects of speech, as well as all contextual clues.

APPENDIX

Data is presented here for the mothers of Oliver, Kerry, Sarah and Julie as follows.

- ia) Number of Utterances by Mother in 10 minute VTR Session;
- ib) Number of words used and number of different words;
- ii) Mean Length of Mother's utterance
 - (a) Using all utterances;
 - (b) Using only 2 word or longer utterances;
- iii) Range in Length in Mother's utterances;
- iv) Repetitions in Mother's speech;
- v) Type Token Ratio;
- vi) One word Utterances;
- vii) Verb usage in Mother's speech;
- viii) Verb phrase usage in Mother's speech;
- ix) Modifier usage in Mother's speech;
- x) Noun phrase usage in Mother's speech.

followed by Functional Analysis of Mothers' speech Data for Oliver, Kerry, Sarah and Julie Tapes.

Finally, the Gloss Analysis of Oliver, Kerry, Sarah and Julie's mothers' speech is presented with Conative, Heuristic and Reciprocal utterances shown separately.

OLIVER TAPES:

ia) Number of Utterances by Mother in 10 minute VTR Session:

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	Total	Average
Child's age (wks)	69	71	73	75	77	80	81	83	86	88	93		
Utterances	76	51	30	36	48	67	55	121	137	72	114	807	73,36

ib) Number of words used by Mother in each 10 minute VTR Session and Number of Different Words.

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	Total	Average
Child's age (wks)	69	71	73	75	77	80	81	83	86	88	93	3 128	284,36
Words	284	182	119	136	190	284	209	413	542	277	492		
Different words	110	89	66	70	75	113	98	136	162	111	169		

ii) Mean Length of Mother's utterance in each 10 minute VTR Session:

a) Using All utterances:

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	Total	Average
Child's age (wks)	69	71	73	75	77	80	81	83	86	88	93		
MLU	3,74	3,57	3,97	3,78	3,96	4,24	3,8	3,41	3,96	3,85	4,32	42,60	3,87

b) Using only 2 word or longer utterances:

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	Total	Average
Child's age (wks)	69	71	73	75	77	80	81	83	86	88	93		
MLU:	4,06	3,91	4,42	4,85	4,46	4,68	4,14	3,37	4,12	4,31	4,6	46,92	4,27

iii)/..

OLIVER TAPES (contd)

iii) Range in Length in Mother's Utterances (Maximum lengths in each session):

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	Total	Average
Child's age (wks)	69	71	73	75	77	80	81	83	86	88	93		
Max. length words	11	12	9	10	12	15	10	10	14	11	18	132	12

iv) Number and Ratio of Total and Partial Repetitions to all speech in each session:

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	Total	Average
Child's age (wks)	69	71	73	75	77	80	81	83	86	88	93		
Total	13	4	3	4	4	10	7	18	28	11	13		
Ratio	,17	,08	,1	,11	,08	,15	,13	,15	,20	,15	,11	1,43	,13

v) Ratio of different words to all words : (Type Token)

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	Total	Average
Child's age (wks)	69	71	73	75	77	80	81	83	86	88	93		
T.T.R.	,39	,49	,55	,51	,39	,40	,47	,33	,30	,40	,34	4,57	,42

vi) Number and Ratio of 1 word utterances to all utterances used by Mother in each session.

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	Total	Average
Child's age (wks)	69	71	73	75	77	80	81	83	86	88	93		
Total	8	6	4	10	7	8	6	6	7	10	9		
Ratio	,11	,12	,13	,28	,15	,12	,09	,05	,05	,14	,08	1,32	,12

viiia)/..

OLIVER TAPES (contd)

viia) Verb usage in Mother's Speech Analysis : Number of Verbs and Ratio to all utterances.

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	Total	Average
Child's age (wks)	69	71	73	75	77	80	81	83	86	88	93		
Verbs *	90	56	30	41	58	82	62	115	164	72	113		
Ratio	1,18	1,10	1,00	1,14	1,21	1,22	1,13	,95	1,20	1,00	1,17	12,30	1,12

* includes verbs, auxiliaries and verb/word combinations.

viib) Verb phrase usage in Mother's speech: Number of phrases and Ratio to 2 word or longer utterances.

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	Total	Average
Child's age (wks)	69	71	73	75	77	80	81	83	86	88	93		
Number	53	36	23	25	29	55	38	83	110	54	85		
Ratio	,78	,80	,88	,96	,71	,93	,78	,72	,85	,87	,81	9,09	,83

viic) Modifier usage in Mother's Speech Analysis : Number of Modifiers and Ratio to all utterances.

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	Total	Average
Child's age (wks)	69	71	73	75	77	80	81	83	86	88	93		
Modifiers *	23	30	12	17	23	31	20	58	42	29	64		
Ratio	,30	,59	,40	,47	,48	,46	,36	,48	,31	,40	,56	4,81	,44

* includes adjectives and adverbs.

viid) Noun phrase usage in Mother's speech : number of phrases and Ratio to 2 word or longer utterances

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	Total	Average
Child's age (wks)	69	71	73	75	77	80	81	83	86	88	93		
Number	30	13	10	15	19	32	37	64	99	40	67		
Ratio	,44	,29	,38	,58	,46	,54	,76	,56	,76	,65	,64	6,06	,55

KERRYIN TAPES:

ia) Number of Utterances by Mother in 10 Minute VTR Session:

Tape No.	2A	3B	3C	4A	4C	5A	5B	5C	6A	6B	6C	7A	7B	8A	8B	8C	9A	10B	Tot.	Av
Child's age (wks)	48	56	58	62	66	69	71	73	75	77	79	84	86	89	91	94	98	104		
Utterances	42	47	64	58	33	45	29	46	28	39	45	48	47	30	64	50	70	34	819	45,5

ib) Number words used by Mother in each 10m.VTR Session and No. of Different Words.

Tape No.	2A	3B	3C	4A	4C	5A	5B	5C	6A	6B	6C	7A	7B	8A	8B	8C	9A	10B	Tot	Av.
Child's age (wks)	48	56	58	62	66	69	71	73	75	77	79	84	86	89	91	94	98	104		
Words	86	169	191	170	93	123	80	132	79	84	112	182	148	77	188	124	125	128		
Different Words	30	49	53	63	45	48	34	50	36	33	58	76	69	45	77	59	59	57	2,291	127,3

ii) Mean Length of Mother's utterance in each 10 minute VTR Session:

a) Using all utterances.

Tape No.	2A	3B	3C	4A	4C	5A	5B	5C	6A	6B	6C	7A	7B	8A	8B	8C	9A	10B	Tot.	Av.
Child's age (wks)	48	56	58	62	66	69	71	73	75	77	79	84	86	89	91	94	98	104		
MLU	2,05	3,60	2,98	2,93	2,8	2,73	2,76	2,87	2,82	2,15	2,49	3,79	3,15	2,57	2,94	2,48	1,79	3,76	50,66	2,8

b) Using only those utterances greater than 2 words.

Tape No.	2A	3B	3C	4A	4C	5A	5B	5C	6A	6B	6C	7A	7B	8A	8B	8C	9A	10B	Tot.	Av.
Child's age (wks)	48	56	58	62	66	69	71	73	75	77	79	84	86	89	91	94	98	104		
MLU	2,91	3,98	4,18	3,43	3,12	3,05	3,22	3,10	3,43	2,96	3,16	4,44	3,46	3,04	3,43	3,11	2,38	4,36	60,76	3,38

iii/....

KERRYIN TAPES (contd):

iii) Range in Length in Mother's Utterances (Maximum lengths in each session):

Tape No.	2A	3B	3C	4A	4C	5A	5B	5C	6A	6B	6C	7A	7B	8A	8B	8C	9A	10B	Tot.	Av.
Child's age (wks)	48	56	58	62	66	69	71	73	75	77	79	84	86	89	91	94	98	104		
Max. length words	4	9	10	9	7	8	5	7	6	5	6	9	8	7	7	8	7	8	130	7,2

iv) Number and Ratio of Total and Partial Repetitions to all speech in each session.

Tape No.	2A	3B	3C	4A	4C	5A	5B	5C	6A	6B	6C	7A	7B	8A	8B	8C	9A	10B	Tot.	Av.
Child's age (wks)	48	56	58	62	66	69	71	73	75	77	79	84	86	89	91	94	98	104		
All rep. total & partial.	17	17	25	9	7	10	6	11	13	13	11	6	8	2	11	12	11	5		
Ratio	,40	,35	,39	,16	,21	,22	,19	,29	,46	,33	,22	,12	,17	,06	,16	,24	,16	,15	4,28	,24

v) Ratio of different words to all words : (Type Token)

Tape No.	2A	3B	3C	4A	4C	5A	5B	5C	6A	6B	6C	7A	7B	8A	8B	8C	9A	10B	Tot.	Av.
Child's age (wks)	48	56	58	62	66	69	71	73	75	77	79	84	86	89	91	94	98	104		
T.T.R.	,35	,29	,28	,37	,48	,39	,43	,38	,46	,39	,52	,42	,47	,58	,41	,48	,47	,45	7,62	,42

vi) Number and Ratio of 1 word utterances to all utterances used by Mother in each session.

Tape No.	2A	3B	3C	4A	4C	5A	5B	5C	6A	6B	6C	7A	7B	8A	8B	8C	9A	10B	Tot.	Av.
Child's age (wks)	48	56	58	62	66	69	71	73	75	77	79	84	86	89	91	94	98	104		
Total	19	6	24	12	5	7	6	5	7	16	14	9	6	7	13	15	30	6		
Ratio	,45	,13	,38	,21	,15	,16	,21	,11	,25	,41	,31	,19	,13	,23	,20	,30	,43	,18	4,43	,25

KERRY N TAPES:

viia) Verb usage in Mother's Speech Analysis : Number of Verbs and Ratio to all utterances.

Tape No.	2A	3B	3C	4A	4C	5A	5B	5C	6A	6B	6C	7A	7B	8A	8B	8C	9B	10B	Tot.	Av.
Child's age (wks)	48	56	58	62	66	69	71	73	75	77	79	84	86	89	91	94	98	104		
Verbs *	18	61	58	49	22	46	23	46	28	31	38	59	52	27	61	46	39	40		
Ratio	,43	1,30	,91	,84	1,10	1,02	,79	1,00	1,00	,79	,84	1,23	,90	,90	,95	,92	,56	1,18	16,66	,93

* includes verbs, auxiliaries and verb/word combinations.

viib) Verb phrase usage in Mother's speech: Number of phrases and Ratio to 2 word or longer utterances.

Tape No.	2A	3B	3C	4A	4C	5A	5B	5C	6A	6B	6C	7A	7B	8A	8B	8C	9B	10B	Tot.	Av.
Child's age (wks)	48	56	58	62	66	69	71	73	75	77	79	84	86	89	91	94	98	104		
Number	16	41	39	38	17	35	16	40	17	22	30	36	37	21	50	39	33	33		
Ratio	,70	1,00	,98	,83	1,00	,92	,70	,98	,81	,96	,97	,92	,90	,91	,98	1,1	,83	1,18	16,67	,93

viic) Modifier usage in Mother's Speech Analysis : Number of Modifiers and Ratio to all utterances.

Tape No.	2A	3B	3C	4A	4C	5A	5B	5C	6A	6B	6C	7A	7B	8A	8B	8C	9B	10B	Tot.	Av.
Child's age (wks)	48	56	58	62	66	69	71	73	75	77	79	84	86	89	91	94	98	104		
Modifiers*	4	4	15	9	1	10	8	3	8	10	18	19	15	6	18	3	17	8		
Ratio	,10	,09	,23	,16	,05	,22	,28	,07	,29	,26	,40	,40	,26	,20	,28	,06	,24	,24	5.26	,29

* includes adjectives and adverbs.

viid) Noun phrase usage in Mother's speech : number of phrases and Ratio to 2 word or longer utterances

Tape No.	2A	3B	3C	4A	4C	5A	5B	5C	6A	6B	6C	7A	7B	8A	8B	8C	9B	10B	Tot.	Av.
Child's age (wks)	48	56	58	62	66	69	71	73	75	77	79	84	86	98	91	94	98	104		
Number	7	14	27	18	9	11	10	19	8	5	11	18	12	9	21	7	20	12		
Ratio	,30	,34	,68	,39	,53	,29	,43	,46	,38	,22	,35	,46	,29	,39	,41	,20	,50	,43	7,05	,39

SARAH TAPES:

ia) Number of Utterances by Mother in 10 minute VTR Session:

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C
Child's age (wks)	23	27	29	32	35	36	40	42	44	45	47	49	51	55	58	60	63	65
Utter- ances	77	52	38	126	103	38	93	111	140	98	126	100	98	96	95	87	117	123
	Total: 1,718			Average: 95														

ib) Number of words used by Mother in each 10 minute VTR Session and Number of Different Words.

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C
Child's age (wks)	23	27	29	32	35	36	40	42	44	45	47	49	51	55	53	60	63	65
Words	196	112	85	369	225	102	232	332	386	275	338	275	260	270	330	232	291	350
	Total: 4,660			Average: 258,9														

Different words	58	47	41	87	57	50	68	107	102	75	95	85	80	93	93	77	74	100
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ii) Mean Length of Mother's utterance in each 10 minute VTR Session : (a) Using all utterances

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C
Child's age (wks)	23	27	29	32	35	36	40	42	44	45	47	49	51	55	53	60	63	65
MLU	2,57	2,06	2,24	2,98	2,25	2,68	2,49	2,99	2,76	2,80	2,68	2,75	2,65	2,81	3,47	2,67	2,49	2,85
	Total: 48,19			Average: 2,68														

b) Using only 2 word or longer utterances:

SARAH TAPES (Contd).

ii) Mean Length of Mother's utterance in each 10 minute VTR Session (Contd).

b) Using only 2 word or longer utterances:

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C
Child's age (wks)	23	27	29	32	35	36	40	42	44	45	47	49	51	55	58	60	63	65
MLU	3,16	2,46	3,17	3,68	2,94	2,88	3,14	3,80	3,41	3,39	3,47	3,33	3,57	3,45	4,15	3,34	3,68	3,58
Total:			60,58		Average:		3,37											

iii) Range in Length in Mother's Utterances (Maximum lengths in each session)

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C
Child's age (wks)	23	27	29	32	35	36	40	42	44	45	47	49	51	55	58	60	63	65
Max. Length words.	6	6	5	6	6	5	9	10	10	7	12	8	8	10	9	10	8	10
Total:			145		Average:		8,1											

iv) Number and Ratio of Total and Partial Repetitions to all speech in each session

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C
Child's age (wks)	23	27	29	32	35	36	40	42	44	45	47	49	51	55	58	60	63	65
Total	18	12	8	35	18	4	30	14	46	28	31	24	36	23	22	25	28	28
Ratio	,23	,23	,21	,28	,17	,11	,32	,13	,33	,29	,25	,24	,37	,24	,23	,29	,24	,23
Total:			4,44		Average:		,25											

SARAH TAPES (Contd).

v) Ratio of different words to all words: (Type Token).

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C
Child's age (wks)	23	27	29	32	35	36	40	42	44	45	47	49	51	55	58	60	63	65
T.T.R.	,30	,42	,48	,24	,25	,48	,29	,33	,26	,27	,28	,31	,31	,34	,30	,33	,25	,29
	Total: 5,73			Average: ,32														

vi) Number and Ratio of 1 word utterances to all utterances used by Mother in each session.

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C
Child's age (wks)	23	27	29	32	35	36	40	42	44	45	47	49	51	55	58	60	63	65
Total	21	13	16	33	31	4	28	32	38	24	40	25	35	26	20	25	52	35
Ratio	,28	,25	,42	,26	,30	,11	,30	,29	,27	,24	,32	,25	,36	,26	,21	,29	,44	,28
	Total: 5,13			Average: ,29														

vii) Verb usage in Mother's Speech Analysis : Number of Verbs and Ratio to all utterances.

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C
Child's age (wks)	23	27	29	32	35	36	40	42	44	45	47	49	51	55	58	60	63	65
Verbs*	56	28	23	85	56	26	80	92	130	65	89	78	53	70	89	83	82	113
Ratio	,72	,54	,61	,67	,54	,68	,86	,83	,93	,66	,71	,78	,54	,73	,94	,95	,70	,92
	Total: 13,31			Average: ,74														

* includes verbs, auxiliaries and verb/word combinations.

SARAH TAPES (Contd).

viib) Verb phrase usage in Mother's speech: Number of phrases and Ratio to 2 word or longer utterances.

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C
Child's age (wks)	23	27	29	32	35	36	40	42	44	45	47	49	51	55	58	60	63	65
Number	30	17	16	58	31	20	51	56	80	48	51	48	39	48	57	50	55	75
Ratio	,54	,44	,73	,62	,43	,59	,78	,71	,78	,65	,59	,64	,62	,68	,76	,81	,85	,85
Total:	12,07			Average: ,67														

viic) Modifier usage in Mother's Speech Analysis : Number of Modifiers and Ratio to all utterances.

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C
Child's age (wks)	23	27	29	32	35	36	40	42	44	45	47	49	51	55	58	60	63	65
Modifiers*	13	20	5	33	12	9	9	21	22	18	20	18	7	18	19	7	20	22
Ratio	,17	,38	,13	,26	,12	,24	,10	,19	,16	,18	,16	,18	,07	,19	,20	,08	,17	,18
Total:	3,16			Average: ,18														

* includes adjectives and adverbs.

viid) Noun phrase usage in Mother's speech : number of phrases and Ratio to 2 word or longer utterances

Tape No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C
Child's age (wks)	23	27	29	32	35	36	40	42	44	45	47	49	51	55	58	60	63	65
Number	14	8	9	23	8	12	21	23	35	29	26	24	25	27	41	18	27	38
Ratio	,25	,21	,41	,25	,11	,35	,32	,29	,34	,39	,30	,32	,40	,38	,55	,29	,42	,43
Total:	6,01			Average: ,33														

JULIE TAPES:

ia) Number of Utterances by Mother in 10 minute VTR Session.

Tape No.	2C	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C	7A	Tot.	Av.
Child's age (wks)	1	2	3	4	6	8	10	11	14	16	18	22	23		
Utterances	$\bar{X}27$	$\bar{X}40$	51	115	83	78	134	136	114	82	86	93	109	1148	88,3

ib) Number of words used by Mother in each 10 minute VTR Session and Number of Different words

Tape No.	2C	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C	7A	Tot.	Av.
Child's age (wks)	1	2	3	4	6	8	10	11	14	16	18	22	23		
Words	$\bar{X}82$	$\bar{X}128$	130	319	199	205	383	392	314	186	214	305	305	3162	243,2
Different words	$\bar{X}48$	$\bar{X}64$	52	92	78	67	117	105	79	69	68	95	102		

ii) Mean Length of Mother's utterance in each 10 minute VTR Session. a) Using all utterances

Tape No.	2C	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C	7A	Total	Av.
Child's age (wks)	1	2	3	4	6	8	10	11	14	16	18	22	23		
MLU	$\bar{X}3,09$	$\bar{X}3,17$	2,55	2,77	2,40	2,63	2,86	2,88	2,75	2,27	2,49	3,28	2,80	35,94	2,76

b) Using only 2 word or longer utterances:

Tape No.	2C	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C	7A	Total	Av.
Child's age (wks)	1	2	3	4	6	8	10	11	14	16	18	22	23		
MLU:	$\bar{X}3,40$	$\bar{X}3,59$	3,19	3,43	3,42	3,66	3,44	3,25	3,38	3,36	3,29	3,62	3,13	44,16	3,40

JULIE TAPES:

iii) Range in Length in Mother's Utterances (Maximum lengths in each session):

Tape No.	2C	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C	7A	Tot.	Av.
Child's age (wks)	1	2	3	4	6	8	10	11	14	16	18	22	23		
Max. length words.	$\bar{X}8$	$\bar{X}11,5$	11	9	8	10	7	7	6	8	10	9	9	113	8,7

iv) Number and Ratio of Total and Partial Repetitions to all speech in each session:

Tape No.	2C	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C	7A	Tot.	Av.
Child's age (wks)	1	2	3	4	6	8	10	11	14	16	18	22	23		
Total	$\bar{X}4,4$	$\bar{X}10$	16	39	35	31	40	35	43	25	32	28	29		
Ratio	$\bar{X},15$	$\bar{X},25$	,31	,34	,42	,40	,30	,26	,38	,30	,37	,30	,27	405	,31

v) Ratio of different words to all words : (Type Token)

Tape No.	2C	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C	7A	Tot.	Av.
Child's age (wks)	1	2	3	4	6	8	10	11	14	16	18	22	23		
T.T.R.	$\bar{X},59$	$\bar{X},49$	,40	,29	,39	,33	,31	,27	,25	,37	,32	,31	,33	4,65	,36

vi) Number and Ratio of 1 word utterances to all utterances used by Mother in each session.

Tape No.	2C	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C	7A	Tot.	Av.
Child's age (wks)	1	2	3	4	6	8	10	11	14	16	18	22	23		
Total	$\bar{X}4$	$\bar{X}7$	15	31	35	30	32	22	30	38	30	12	17		
Ratio	$\bar{X},13$	$\bar{X},17$	,29	,27	,42	,38	,24	,16	,26	,46	,35	,13	,16	3,42	,26

JULIE TAPES:

viia) Verb usage in Mother's Speech Analysis : Number of Verbs and Ratio to all utterances.

Tape No.	2B	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C	7A	Tot.	Av.
Child's age (wks)	1	2	3	4	6	8	10	11	14	16	18	22	23		
Verbs*	$\bar{X}27$	$\bar{X}35$	41	105	57	47	108	113	89	60	87	101	101		
Ratio	$\bar{X}1,00$	$\bar{X},85$	,80	,91	,69	,60	,81	,83	,78	,73	1,01	1,09	,93	11,03	,85

* includes verbs, auxilliaries and verb/word combinations.

viib) Verb phrase usage in Mother's speech : Number of phrases and Ratio to 2 word or longer utterances.

Tape No.	2B	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C	7A	Tot.	Av.
Child's age (wks)	1	2	3	4	6	8	10	11	14	16	18	22	23		
Number	$\bar{X}17$	$\bar{X}24$	23	70	40	36	69	74	52	29	41	73	62		
Ratio	$\bar{X},71$	$\bar{X},71$	,64	,83	,83	,75	,68	,65	,62	,66	,73	,90	,67	9,38	,72

viic) Modifier usage in Mother's Speech Analysis : Number of Modifiers and Ratio to all utterances

Tape No.	2B	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C	7A	Tot.	Av.
Child's age (wks)	1	2	3	4	6	8	10	11	14	16	18	22	23		
Modifiers*	$\bar{X}14$	$\bar{X}30$	26	46	22	51	65	79	29	17	14	32	43		
Ratio	$\bar{X},52$	$\bar{X},73$	,51	,40	,27	,65	,49	,58	,52	,21	,16	,34	,39	5,50	,42

* includes adjectives and adverbs.

viid) Noun phrase usage in Mother's speech : number of phrases and Ratio to 2 word or longer utterances

Tape No.	2B	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C	7A	Tot.	Av.
Child's age (wks)	1	2	3	4	6	8	10	11	14	16	18	22	23		
Number	$\bar{X}4$	$\bar{X}8$	7	16	16	20	20	18	17	14	12	16	12		
Ratio	$\bar{X},17$	$\bar{X},24$	,19	,19	,33	,42	,20	,16	,20	,31	,21	,20	,13	2,95	,23

OLIVER DATA.	FUNCTIONAL ANALYSIS OF MOTHER'S SPEECH.										
Session:	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B
Child's age (wks)	69	71	73	75	77	80	81	83	86	88	93
Function											
Conative	57	33	19	26	23	32	17	53	65	38	46
Ratio	,75	,65	,63	,72	,48	,48	,31	,44	,47	,53	,40
Heuristic	10	5	4	5	18	26	28	54	56	23	47
Ratio	,13	,10	,13	,14	,38	,39	,51	,45	,41	,32	,41
Reciprocal	9	11	7	4	6	8	8	13	14	10	21
Ratio	,12	,22	,23	,11	,13	,12	,15	,11	,10	,14	,18
Emotive	.	2	.	1	.	.	2	1	2	1	.
Ratio		,04		,03			,04	,01	,01	,01	
Terminating	.	.	.	.	.	.	.	.	.	.	.
Unclassifiable	.	.	.	.	.	1	.	.	.	.	.
Ratio						,01					
Non-communicative	.	.	.	.	.	.	.	.	.	.	.
Number of utterances:	76	51	30	36	48	67	55	121	137	72	114

<u>KERRY DATA</u>	<u>FUNCTIONAL ANALYSIS OF MOTHER'S SPEECH</u>																	
Session:	2A	3B	3C	4A	4C	5A	5B	5C	6A	6B	6C	7A	7B	8A	8B	8C	9A	10B
Child's age (wks)	48	56	58	62	66	69	71	73	75	77	79	84	86	89	91	94	98	104
Function																		
Conative	39	38	55	44	18	37	22	30	21	29	30	29	37	21	46	24	30	25
Ratio	,93	,81	,86	,76	,55	,82	,76	,65	,75	,74	,67	,60	,79	,70	,72	,48	,43	,74
Heuristic	.	4	2	6	8	4	4	7	2	2	7	12	5	5	11	13	29	2
Ratio		,09	,03	,10	,24	,09	,18	,15	,07	,05	,16	,25	,11	,17	,17	,26	,41	,06
Reciprocal	1	5	5	7	7	3	2	9	1	7	5	5	3	3	7	13	7	7
Ratio	,02	,11	,08	,12	,21	,07	,07	,20	,04	,18	,11	,10	,06	,10	,11	,26	,10	,21
Emotive	1	.	1	1	.	1	1	.	4	.	2	2	1	1	.	.	.	.
Ratio	,02		,02	,02	.	,02	,03		,14		,04	,04	,02	,03				
Terminating	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.
Ratio	,02		,02														,05	
Unclassifiable	.	.	.	.	.	.	.	.	.	1	1	.	1	.	.	.	.	.
Ratio										,03	,02		,02					
Non-communicative	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Number of utterances:	42	47	64	58	33	45	29	46	28	39	45	48	47	30	64	50	70	34

<u>SARAH DATA</u>		<u>FUNCTIONAL ANALYSIS OF MOTHER'S SPEECH</u>																
Session	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C
Child's age (wks)	23	27	29	32	35	36	40	42	44	45	47	49	51	55	58	60	63	65
Function																		
Conative	41	29	21	63	57	19	63	60	95	60	68	53	60	48	54	47	51	73
Ratio	,53	,56	,55	,50	,55	,50	,68	,54	,68	,61	,54	,53	,61	,50	,57	,54	,44	,59
Heuristic	17	12	13	35	31	10	19	27	25	23	36	33	23	35	21	18	30	25
Ratio	,22	,23	,34	,28	,30	,26	,20	,24	,18	,24	,29	,33	,24	,36	,22	,21	,26	,20
Reciprocal	13	9	4	17	4	4	11	14	14	11	16	11	10	10	16	17	29	20
Ratio	,17	,17	,11	,13	,04	,11	,12	,13	,10	,11	,13	,11	,10	,10	,17	,20	,25	,16
Emotive	6	2	.	8	8	2	.	8	5	4	4	3	5	3	4	4	7	5
Ratio	,08	,04		,06	,08	,05		,07	,04	,04	,03	,03	,05	,03	,04	,05	,06	,04
Terminating	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Unclassifiable	.	.	.	3	3	3	.	2	1	.	2	.	.	.	.	.	.	.
Ratio				,02	,03	,08		,02	,01		,02							
Non-communicative	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Number of utterances:	77	52	38	126	103	38	93	111	140	98	126	100	98	96	95	87	117	123

JULIE DATAFUNCTIONAL ANALYSIS OF MOTHER'S SPEECH

Session:	2C	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C	7A
Child's age (wks)	1	2	3	4	6	8	10	11	14	16	18	22	23
Function													
Conative	22	15	27	65	48	33	56	65	56	33	56	54	61
Ratio	,52	,37	,53	,57	,58	,42	,42	,48	,49	,40	,65	,58	,56
Heuristic	8	10	7	17	11	22	32	33	30	26	19	25	28
Ratio	,19	,24	,14	,15	,13	,28	,24	,24	,26	,32	,22	,27	,26
Reciprocal	11	13	13	26	17	19	30	29	22	20	9	11	14
Ratio	,26	,32	,25	,23	,21	,24	,22	,21	,19	,24	,11	,12	,13
Emotive	1	3	4	7	7	4	12	6	5	2	1	3	4
Ratio	,02	,07	,08	,06	,08	,05	,09	,04	,04	,02	,01	,03	,04
Terminating	.	.	.	.	.	.	.	.	.	.	.	.	.
Unclassifiable	.	.	.	.	.	.	4	3	1	1	1		2
Ratio							,03	,02	,01	,01	,01		,02
Non-communicative	.	.	.	.	.	.	.	.	.	.	.	.	.
Number of utterances:	42	41	51	115	83	78	134	136	114	82	86	93	109

OLIVER TAPES		GLOSS ANALYSIS		CONATIVE FUNCTION (IN RANK ORDER)			
69 wks. Gl. 1A R.	71 wks. Gl. 1B R.	73 wks. Gl. 1C R.	75 wks. Gl. 2A R.	77 wks. Gl. 2B R.	80 wks. Gl. 2C R.	81 wks. Gl. 3A R.	83 wks. Gl. 3B R.
11 17 ,29	11 16 ,41	11 11 ,43	24 11 ,35	24 16 ,53	24 18 ,46	11 11 ,44	24 23 ,40
24 16 ,27	24 13 ,33	24 6 ,23	10 } 7 ,23	11 7 ,23	11 12 ,31	24 8 ,32	11 20 ,35
10 10 ,17	10 6 ,15	8 } 4 ,15	19 } 7 ,23	10 4 ,13	10 4 ,10	14 3 ,12	19 5 ,09
7 8 ,14	14 2 ,05	10 } 4 ,15	11 6 ,19	1 } 1 ,03	3 } 2 ,05	10 2 ,08	8 } 3 ,05
8 4 ,07	7 } 1 ,03	18 1 ,04		4 } 1 ,03	14 } 2 ,05	7 1 ,04	10 } 3 ,05
19 3 ,05	19 } 1 ,03			19 } 1 ,03	19 1 ,03		14 2 ,04
3 1 ,02							7 1 ,02
TOT: 59	39	26	31	30	39	25	57

86 wks. Gl. 3C R.	88 wks- Gl. 4A R.	93 wks. Gl. 4B R.
24 43 ,56	11 17 ,37	24 34 ,62
11 21 ,27	24 14 ,30	11 10 ,18
10 8 ,10	1 7 ,15	1 4 ,07
17 } 2 ,03	10 5 ,11	10 } 2 ,04
18 } 2 ,03	3 2 ,04	18 } 2 ,04
19 1 ,01	18 1 ,02	19 } 2 ,04
		8 1 ,02
TOT: 77	46	55

Note: Throughout these tables Gl. = the Gloss number; this is followed by the number of Glosses in the particular session; R. = the Ratio to all other Glosses, in that session.

OLIVER TAPES		GLOSS ANALYSIS		HEURISTIC FUNCTION (IN RANK ORDER)			
69 wks. Gl. 1A R.	71 wks. Gl. 1B R.	73 wks. Gl. 1C R.	75 wks. Gl. 2A R.	77 wks. Gl. 2B R.	80 wks. Gl. 2C R.	81 wks. Gl. 3A R.	83 wks. Gl. 3B R.
7 8 ,32	14 4 ,50	7 4 ,50	7 5 ,50	7 14 ,64	7 18 ,58	7 21 ,64	7 33 ,54
6 } 5 ,20	7 2 ,24	6 3 ,37	6 4 ,40	6 6 ,27	6 10 ,32	6 10 ,30	14 11 ,18
8 } 5 ,20	6 } 1 ,13	8 1 ,13	24 1 ,10	17 } 1 ,05	15 2 ,06	14 } 1 ,03	6 8 ,13
4 } 3 ,12	24 } 1 ,13			18 } 1 ,05	18 1 ,03	8 } 1 ,03	8 7 ,11
10 } 3 ,12							16 } 1 ,02
18 1 ,04							18 } 1 ,02
TOT:25	8	8	10	22	31	33	61

86 wks. Gl. 3C R.	88 wks. Gl. 4A R.	93 wks. Gl. 4B R.
7 29 ,44	7 15 ,43	7 38 ,67
6 28 ,43	14 11 ,31	6 9 ,16
8 7 ,11	17 4 ,11	8 5 ,09
24 2 ,03	6 } 2 ,06	18 } 2 ,04
	24 } 2 ,06	24 } 2 ,04
	18 1 ,03	14 1 ,02
TOT:66	35	57

OLIVER TAPES		GLOSS ANALYSIS		RECIPROCAL FUNCTION (IN RANK ORDER)			
69 wks. Gl. 1A R.	71 wks. Gl. 1B R.	73 wks. Gl. 1C R.	75 wks. Gl. 2A R.	77 wks. Gl. 2B R.	80 wks. Gl. 2C R.	81 wks. Gl. 3A R.	83 wks. Gl. 3B R.
17 9 ,39	17 10 ,59	17 6 ,50	17 4 ,44	17 5 ,61	17 7 ,70	17 7 ,54	17 13 ,59
21 4 ,17	20 6 ,35	24 3 ,25	20 3 ,34	20 } 1 ,13	7 } 1 ,10	14 } 2 ,15	20 5 ,23
19 } 3 ,13	24 1 ,06	10 2 ,17	7 } 1 ,11	21 } 1 ,13	20 } 1 ,10	20 } 2 ,15	7 } 2 ,09
20 } 3 ,13		20 1 ,08	14 } 1 ,11	24 } 1 ,13	24 } 1 ,10	7 } 1 ,08	14 } 2 ,09
4 2 ,09						24 } 1 ,08	
14 } 1 ,04							
24 } 1 ,04							
TOT: 23	17	12	9	8	10	13	22
<hr/>							
86 wks. Gl. 3C R.	88 wks. Gl. 4A R.	93 wks. Gl. 4B R.					
17 14 ,47	17 10 ,59	17 18 ,50					
20 10 ,33	20 4 ,23	20 10 ,28					
24 4 ,13	4 2 ,12	4 } 2 ,06					
6 2 ,07	24 1 ,06	11 } 2 ,06					
		23 } 2 ,06					
		24 } 2 ,06					
TOT: 30	17	36					

KERRY TAPES		GLOSS ANALYSIS		CONATIVE FUNCTION (IN RANK ORDER)				
48 wks. Gl. 2A R.	56 wks Gl. 3B R.	58 wks. Gl. 3C R.	62 wks. Gl. 4A R.	66 wks. Gl. 4C R.	69 wks. Gl. 5A R.	71 wks. Gl. 5B R.	73 wks. Gl. 5C R.	75 wks. Gl. 6A R.
1} 12 ,24	11 25 ,45	11 26 ,41	11 18 ,24	11 9 ,50	11 21 ,50	11 11 ,46	24 18 ,51	11 11 ,44
19} 12 ,25	1 12 ,21	19 14 ,22	24 11 ,24	24 6 ,33	24 12 ,29	24 7 ,29	11 11 ,31	24 6 ,24
3} 7 ,15	19 6 ,11	1 10 ,16	19 9 ,20	19 2 ,11	10 5 ,12	19 3 ,13	1 4 ,11	19 3 ,12
11} 7 ,15	8 4 ,07	24 6 ,10	1} 3 ,07	8 1 ,06	1} 2 ,05	1} 1 ,04	10} 1 ,03	7 2 ,08
24 5 ,10	10} 3 ,18	10 5 ,08	3} 3 ,07		19} 2 ,05	3} 1 ,04	19} 1 ,03	10} 1 ,04
10 4 ,08	24} 3 ,18	8 2 ,03	10 2 ,04			8} 1 ,04		18} 1 ,04
4 1 ,02	14 2 ,04							22} 1 ,04
	15 1 ,02							
TOT: 48	56	63	46	18	42	24	35	25
77 wks. Gl. 6B R.	79 wks. Gl. 6C R.	84 wks. Gl. 7A R.	86 wks. Gl. 7B R.	89 wks. Gl. 8A R.	91 wks. Gl. 8B R.	94 wks. Gl. 8C R.	98 wks. Gl. 9B R.	104 wks. Gl. 10B R.
11 15 ,50	11 18 ,58	11 11 ,37	11 21 ,45	11} 9 ,38	11 19 ,39	24 16 ,67	24 17 ,53	11 18 ,64
24 6 ,20	24 9 ,29	24 9 ,30	24 8 ,17	24} 9 ,38	24 15 ,31	11 7 ,26	11 11 ,34	8 3 ,11
10 4 ,13	10} 2 ,06	1 5 ,17	1 7 ,15	10 4 ,17	10 7 ,14	10 3 ,11	10 4 ,13	10} 2 ,07
8} 2 ,06	19} 2 ,06	10 4 ,13	10 6 ,13	1 2 ,07	21 3 ,06	1 1 ,04		24} 2 ,07
19} 2 ,06		19 1 ,03	5} 2 ,04		19 2 ,04			1} 1 ,04
3 1 ,03			19} 2 ,04		1} 1 ,02			7} 1 ,04
			8 1 ,02		7} 1 ,02			18} 1 ,04
					8} 1 ,02			
TOT: 30	31	30	47	24	49	27	32	28

Note: Throughout these tables Gl. = the Gloss number; this is followed by the number of Glosses in the particular session; and R. = the Ratio to all other Glosses in that session.

KERRY TAPES		GLOSS ANALYSIS			HEURISTIC FUNCTION (IN RANK ORDER)			
48 wks. Gl. 2A R.	56 wks. Gl. 3B R.	58 wks. Gl. 3C R.	62 wks. Gl. 4A R.	66 wks. Gl. 4C R.	69 wks. Gl. 5A R.	71 wks. Gl. 5B R.	73 wks. Gl. 5C R.	75 wks. Gl. 6A R.
	7 } 2 ,20	7 2 1,00	7 6 ,43	6 } 5 ,42	7 4 ,44	7 7 ,64	7 7 ,64	6 } 2 ,50
	8 } 2 ,20		6 3 ,21	7 } 5 ,42	6 } 1 ,17	14 2 ,22	6 3 ,27	7 } 2 ,50
	15 } 2 ,20		8 } 2 ,14	8 2 ,16	8 } 1 ,17	6 } 1 ,11	14 1 ,09	
	18 } 2 ,20		18 } 2 ,14			8 } 1 ,11		
	24 } 2 ,20		15 1 ,07			17 } 1 ,11		
TOT:	10	2	14	12	6	9	11	4
77 wks. Gl. 6B R.	79 wks. Gl. 6C R.	84 wks. Gl. 7A R.	86 wks. Gl. 7B R.	89 wks. Gl. 8A R.	91 wks. Gl. 8B R.	94 wks. Gl. 8C R.	98 wks. Gl. 9B R.	104 wks. Gl. 10B R.
7 2 1,00	7 7 ,54	7 10 ,48	7 5 ,63	7 5 ,45	6 8 ,50	6 } 11 ,39	6 26 ,52	7 2 ,50
	6 } 2 ,15	8 } 3 ,14	6 2 ,25	6 5 ,45	7 7 ,44	7 } 11 ,39	7 14 ,28	6 } 1 ,25
	24 } 2 ,15	15 } 3 ,14	24 1 ,13	18 1 ,09	17 1 ,06	8 } 2 ,07	17 4 ,08	8 } 1 ,25
	8 } 1 ,08	6 2 ,10				14 } 2 ,07	14 3 ,06	
	17 } 1 ,08	14 } 1 ,05				15 } 1 ,04	18 2 ,04	
		16 } 1 ,05				18 } 1 ,04	11 1 ,02	
		18 } 1 ,05						
TOT: 2	13	21	8	11	16	28	50	4

KERRY N		TAPES		GLOSS ANALYSIS				RECIPROCAL FUNCTION				(IN RANK ORDER)					
48 wks.		56 wks.		58 wks.		62 wks.		66 wks.		69 wks.		71 wks.		73 wks.		75 wks.	
Gl. 2A R.		Gl. 3B R.		Gl. 3C R.		Gl. 4A R.		Gl. 4C R.		Gl. 5A R.		Gl. 5B R.		Gl. 5C R.		Gl. 6A R.	
17	1 1,00	17	3 ,50	17	6 ,55	17	7 ,44	17	5 ,71	17	3 ,75	17	2 ,67	17	9 ,56	17	1 1,00
		4	2 ,33	4	2 ,18	20	4 ,25	4	2 ,29	4	1 ,25	20	1 ,33	4	7 ,44		
		24	1 ,17	1	1 ,09	4	3 ,19										
				20	1 ,09	24	2 ,13										
				24	1 ,09												
TOT: 1		6		11		16		7		4		3		16		1	
77 wks.		79 wks.		84 wks.		86 wks.		89 wks.		91 wks.		94 wks.		98 wks.		104 wks.	
Gl. 6B R.		Gl. 6C R.		Gl. 7A R.		Gl. 7B R.		Gl. 8A R.		Gl. 8B R.		Gl. 8C R.		Gl. 9B R.		Gl. 10B R.	
17	7 ,50	17	5 ,38	17	5 ,56	17	3 ,60	17	3 ,75	17	7 ,54	17	12 ,63	17	7 ,70	17	7 ,87
4	5 ,36	21	4 ,31	5	3 ,33	5	2 ,40	22	1 ,25	21	4 ,31	23	6 ,32	20	2 ,20	18	1 ,13
21	2 ,14	22	2 ,15	24	1 ,11					4	2 ,15	6	1 ,05	11	1 ,10		
		4	1 ,08														
		24	1 ,08														
TOT: 14		13		9		5		4		13		19		10		8	

SARAH TAPES		GLOSS ANALYSIS			CONATIVE FUNCTION			(IN RANK ORDER)		
23 wks. Gl. 1A R.	27 wks. Gl. 1B R.	29 wks. Gl. 1C R.	32 wks. Gl. 2A R.	35 wks. Gl. 2B R.	36 wks. Gl. 2C R.	40 wks. Gl. 3A R.	42 wks. Gl. 3B R.	44 wks. Gl. 3C R.		
24 18 ,41	3 } 9 ,28	10 7 ,27	24 27 ,40	24 26 ,43	24 7 ,30	11 28 ,38	11 21 ,32	11 36 ,34		
19 9 ,21	11 } 9 ,28	3 } 6 ,23	11 16 ,24	3 18 ,28	11 6 ,26	19 15 ,20	24 20 ,30	19 16 ,15		
11 8 ,18	24 7 ,22	24 } 6 ,23	10 9 ,13	11 14 ,23	10 4 ,17	3 12 ,16	19 10 ,15	24 15 ,14		
3 6 ,14	10 4 ,13	11 4 ,15	3 7 ,10	19 3 ,05	19 3 ,13	10 10 ,14	10 7 ,11	10 } 12 ,11		
10 2 ,05	6 } 1 ,03	19 2 ,08	19 6 ,09		1 } 1 ,04	24 9 ,12	3 4 ,06	1 } 12 ,11		
6 1 ,02	7 } 1 ,03	8 1 ,04	21 2 ,03		7 } 1 ,04		7 3 ,05	3 9 ,08		
	19 } 1 ,03				17 } 1 ,04		21 1 ,02	7 5 ,05		
								17 1 ,01		
TOT: 44	32	26	67	60	23	74	66	106		
45 wks. Gl. 4A R.	47 wks. Gl. 4B R.	49 wks. Gl. 4C R.	51 wks. Gl. 5A R.	55 wks. Gl. 5B R.	58 wks. Gl. 5C R.	60 wks. Gl. 6A R.	63 wks. Gl. 6B R.	65 wks. Gl. 6C R.		
11 19 ,29	11 30 ,34	24 16 ,22	1 28 ,40	11 18 ,32	11 23 ,35	11 26 ,45	11 18 ,27	11 45 ,57		
24 15 ,23	1 19 ,22	10 } 14 ,19	11 15 ,21	24 14 ,25	1 14 ,21	24 11 ,19	24 12 ,18	10 } 10 ,13		
19 13 ,20	24 12 ,14	11 } 14 ,19	19 13 ,19	1 8 ,14	24 12 ,18	1 } 5 ,09	1 11 ,17	24 } 10 ,13		
10 6 ,09	19 10 ,11	1 9 ,13	24 7 ,10	19 7 ,12	10 6 ,09	3 } 5 ,09	10 6 ,09	3 } 4 ,05		
1 5 ,08	3 7 ,08	7 6 ,08	10 4 ,06	10 } 3 ,05	19 4 ,06	10 } 5 ,09	17 } 5 ,08	19 } 4 ,05		
3 3 ,05	10 6 ,07	19 4 ,06	7 2 ,03	3 } 3 ,05	7 3 ,05	19 3 ,05	19 3 ,05	1 } 2 ,03		
7 2 ,03	7 2 ,02	14 } 3 ,04	4 1 ,01	18 2 ,04	3 2 ,03	7 2 ,03	15 } 2 ,03	14 } 2 ,03		
14 } 1 ,02	14 1 ,01	22 } 3 ,04		7 } 1 ,02	14 } 1 ,02	18 1 ,02	18 } 2 ,03	4 } 1 ,01		
17 } 1 ,02		8 2 ,03		8 } 1 ,02	18 } 1 ,02		4 } 1 ,02	8 } 1 ,01		
18 } 1 ,02		3 1 ,01					7 } 1 ,02			
TOT: 66	87	72	70	57	66	58	66	79		

SARAH TAPES		GLOSS ANALYSIS			HEURISTIC FUNCTION				(IN RANK ORDER)	
23 wks. Gl. 1A R.	27 wks. Gl. 1B R.	29 wks. Gl. 1C R.	32 wks. Gl. 2A R.	35 wks. Gl. 2B R.	36 wks. Gl. 2C R.	40 wks. Gl. 3A R.	42 wks. Gl. 3B R.	44 wks. Gl. 3C R.		
7 8 ,40	6 8 ,33	6 8 ,44	6 24 ,60	6 24 ,63	7 8 ,50	7 11 ,41	7 13 ,40	7 17 ,40		
6 4 ,20	7 } 6 ,25	7 7 ,39	7 } 7 ,18	7 } 6 ,16	6 4 ,25	24 7 ,26	6 } 12 ,38	6 10 ,24		
17 3 ,15	17 } 6 ,25	24 2 ,11	17 } 7 ,18	4 } 6 ,16	22 } 2 ,13	6 4 ,15	24 } 4 ,13	24 10 ,24		
10 } 2 ,10	24 3 ,13	17 1 ,06	24 2 ,05	8 } 1 ,03	24 } 2 ,13	22 3 ,11	18 2 ,06	19 4 ,10		
24 } 2 ,10	18 1 ,04			17 } 1 ,03		17 } 1 ,03	17 1 ,03	17 1 ,02		
18 1 ,05						18 } 1 ,03				
TOT 20	24	18	40	38	16	27	32	42		
45 wks. Gl. 4A R.	47 wks. Gl. 4B R.	49 wks. Gl. 4C R.	51 wks. Gl. 5A R.	55 wks. Gl. 5B R.	58 wks. Gl. 5C R.	60 wks. Gl. 6A R.	63 wks. Gl. 6B R.	65 wks. Gl. 6C R.		
6 11 ,38	7 20 ,48	6 26 ,62	6 18 ,56	7 21 ,51	6 15 ,39	6 10 ,48	6 21 ,49	6 18 ,49		
7 9 ,31	6 10 ,24	7 12 ,29	7 7 ,22	6 12 ,29	7 13 ,34	7 8 ,38	7 12 ,28	7 16 ,43		
19 3 ,10	24 6 ,14	11 } 1 ,02	24 3 ,09	24 3 ,07	11 3 ,08	24 2 ,10	24 7 ,16	11 3 ,08		
17 } 2 ,07	17 5 ,12	17 } 1 ,02	19 2 ,06	11 } 2 ,05	22 } 2 ,05	11 1 ,05	11 1 ,02			
18 } 2 ,07	8 1 ,02	18 } 1 ,02	11 } 1 ,03	19 } 2 ,05	24 } 2 ,05		17 } 1 ,02			
24 } 2 ,07		24 } 1 ,02	17 } 1 ,03	17 1 ,02	8 } 1 ,03		22 } 1 ,02			
					17 } 1 ,03					
					18 } 1 ,03					
TOT: 29	42	42	32	41	38	21	43	37		

Note: Throughout these tables Gl. = the Gloss number; this is followed by the number of Glosses in the particular session; R. = the Ratio to all other Glosses, in that session.

SARAH TAPES		GLOSS ANALYSIS			RECIPROCAL FUNCTION (IN RANK ORDER)				
23 wks. Gl. 1A R.	27 wks. Gl. 1B R.	29 wks. Gl. 1C R.	32 wks. Gl. 2A R.	35 wks. Gl. 2B R.	36 wks. Gl. 2C R.	40 wks. Gl. 3A R.	42 wks. Gl. 3B R.	44 wks. Gl. 3C R.	
17 13 1,00	17 6 ,55	17 } 2 ,40	17 14 ,78	17 4 ,30	17 4 ,67	17 7 ,54	17 11 ,58	17 15 ,65	
	20 } 2 ,18	23 } 2 ,40	23 } 2 ,11	11 1 ,20	20 2 ,33	24 3 ,23	24 5 ,26	7 } 3 ,13	
	23 } 2 ,18	24 1 ,20	24 } 2 ,11			23 2 ,15	23 2 ,11	24 } 3 ,13	
	24 1 ,09					20 1 ,08	11 1 ,05	10 } 1 ,04	
								23 } 1 ,04	
TOT 13	11	5	18	5	6	13	19	23	
45 wks. Gl. 4A R.	47 wks. Gl. 4B R.	49 wks. Gl. 4C R.	51 wks. Gl. 5A R.	55 wks. Gl. 5B R.	58 wks. Gl. 5C R.	60 wks. Gl. 6A R.	63 wks. Gl. 6B R.	65 wks. Gl. 6C R.	
17 10 ,77	17 15 ,60	17 10 ,71	17 9 ,75	17 8 ,53	17 12 ,53	17 13 ,65	17 26 ,84	17 18 ,53	
24 3 ,23	23 } 3 ,12	20 } 2 ,14	24 2 ,16	11 } 3 ,20	11 3 ,14	7 3 ,15	7 } 1 ,03	21 5 ,15	
	24 } 3 ,12	24 } 2 ,14	11 1 ,08	21 } 3 ,20	19 } 2 ,10	24 2 ,10	11 } 1 ,03	24 4 ,12	
	11 2 ,08			24 1 ,07	21 } 2 ,10	10 } 1 ,05	21 } 1 ,03	11 3 ,09	
	6 } 1 ,04				7 } 1 ,05	19 } 1 ,05	23 } 1 ,03	19 } 2 ,06	
	18 } 1 ,04				24 } 1 ,05		24 } 1 ,03	20 } 2 ,06	
TOT: 13	25	14	12	15	21	20	31	34	

JULIE TAPES		GLOSS ANALYSIS				CONATIVE FUNCTION		(IN RANK ORDER)	
1 wk.	2 wks.	3 wks.	4 wks.	6 wks.	8 wks.	10 wks.	11 wks.		
Gl. 2C R.	Gl. 3B R.	Gl. 3C R.	Gl. 4A R.	Gl. 4B R.	Gl. 4C R.	Gl. 5A R.	Bl. 5B R.		
24 9 ,38	24 13 ,81	11 14 ,50	11 25 ,38	19 22 ,46	24 21 ,62	24 24 ,42	11 28 ,41		
11 7 ,29	11 2 ,13	24 8 ,29	24 24 ,36	11 12 ,25	19 7 ,21	11 19 ,33	24 27 ,40		
19 4 ,17	19 1 ,06	19 4 ,14	19 12 ,18	24 10 ,21	11 7 ,18	10 } 7 ,12	10 7 ,10		
10 2 ,08		3 2 ,07	10 5 ,08	10 4 ,08		19 } 7 ,12	18 } 3 ,04		
3 } 1 ,04							19 } 3 ,04		
17 } 1 ,04									
TOT 24	16	28	66	48	34	57	68		

14 wks.	16 wks.	18 wks.	22 wks.	23 wks.					
Gl. 5C R.	Gl. 6A R.	Gl. 6B R.	Gl. 6C R.	Gl. 7A R.					
24 25 ,38	11 16 ,46	11 27 ,46	24 31 ,55	11 30 ,44					
11 } 18 ,28	24 13 ,37	24 17 ,29	11 10 ,18	24 22 ,32					
19 } 18 ,28	19 6 ,17	19 9 ,15	19 8 ,14	19 10 ,15					
10 4 ,06		3 5 ,08	3 4 ,07	3 3 ,04					
		10 1 ,02	7 2 ,04	10 2 ,03					
			4 1 ,02	22 1 ,01					
TOT 65	35	59	56	68					

Note: Throughout these tables Gl. = the Gloss number; this is followed by the number of Glosses in the particular session; and R. = the Ratio to all other Glosses in that session.

JULIE TAPES GLOSS ANALYSIS HEURISTIC FUNCTION (IN RANK ORDER)

1 wk. Gl. 2C R	2 wks. Gl. 3B R.	3 wks. Gl. 3C R	4 wks. Gl. 4A R.	6 wks. Gl. 4B R	8 wks. Gl. 4C R	10 wks. Gl. 5A R.	11 wks. Gl. 5B R.
17 7 ,88	17 7 ,70	17 5 ,71	17 13 ,76	17 11 ,85	17 15 ,54	17 18 ,50	17 21 ,53
18 1 ,22	18 2 ,20	7 2 ,29	18 2 ,12	7 } 1 ,08	7 8 ,29	18 11 ,31	18 6 ,15
	7 1 ,10		7 } 1 ,06	18 } 1 ,08	18 2 ,07	7 5 ,14	7 } 4 ,10
			24 } 1 ,06		6 } 1 ,04	24 2 ,05	14 } 4 ,10
					8 } 1 ,04		15 2 ,05
					24 } 1 ,04		16 } 1 ,03
							22 } 1 ,03
							24 } 1 ,03
TOT: 8	10	7	17	13	28	36	40

14 wks. Gl. 5C R.	16 wks. Gl. 6A R.	18 wks. Gl. 6B R.	22 wks. Gl. 6C R.	23 wks. Gl. 7A R.
17 17 ,57	17 12 ,41	7 8 ,38	7 14 ,35	7 10 ,33
18 9 ,30	7 8 ,28	17 5 ,24	18 9 ,23	17 9 ,30
6 } 1 ,03	6 4 ,14	8 3 ,14	17 7 ,18	18 8 ,27
10 } 1 ,03	8 } 2 ,07	6 2 ,10	24 4 ,10	22 2 ,07
14 } 1 ,03	24 } 2 ,07	18 2 ,10	6 3 ,08	6 1 ,03
24 } 1 ,03	18 1 ,03	24 1 ,05	8 2 ,05	
			4 1 ,03	
TOT: 30	29	21	40	30

JULIE TAPES		GLOSS ANALYSIS				RECIPROCAL FUNCTION (IN RANK ORDER)		
1 wk. Gl. 2C R.	2 wks. Gl. 3B R.	3 wks. Gl. 3C R.	4 wks. Gl. 4A R.	6 wks. Gl. 4B R.	8 wks. Gl. 4C R.	10 wks. Gl. 5A R.	11 wks. Gl. 5B R.	
17 11 1,00	17 11 ,73	17 10 ,67	17 22 ,73	17 15 ,88	17 16 ,80	17 23 ,68	17 20 ,59	
	20 } 2 ,13	22 } 2 ,13	24 4 ,13	24 2 ,22	20 3 ,15	24 8 ,24	20 10 ,29	
	22 } 2 ,13	24 } 2 ,13	20 } 2 ,07		24 1 ,05	22 2 ,06	24 2 ,06	
		18 1 ,07	22 } 2 ,07			18 1 ,03	11 } 1 ,03	
							22 } 1 ,03	
TOT: 11	15	15	30	17	20	34	34	
14 wks. Gl. 5C R.	16 wks. Gl. 6A R.	18 wks. Gl. 6B R.	22 wks. Gl. 6C R.	23 wks. Gl. 7A R.				
17 19 ,66	17 17 ,85	17 8 ,73	17 11 ,65	17 14 ,74				
20 5 ,17	24 2 ,10	20 2 ,18	24 4 ,24	24 4 ,21				
24 4 ,14	11 1 ,05	24 1 ,09	11 } 1 ,06	22 1 ,05				
11 1 ,03			21 } 1 ,06					
TOT 29	20	11	17	19				

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