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Elements of style: Maternal and child contributions to the referential and expressive styles of language acquisition

Hampson, June Elizabeth, Ph.D.

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U·M·I
300 N. Zeeb Rd.
Ann Arbor, MI 48106

ELEMENTS OF STYLE: MATERNAL AND CHILD CONTRIBUTIONS TO THE REFERENTIAL AND EXPRESSIVE STYLES OF LANGUAGE ACQUISITION

by

JUNE HAMPSON

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Katherine Nelson
Chairperson of Examining Committee

4-24-89
date

Herbert D. Solzstein
Executive Officer

Katherine Nelson

Joseph Glick

John Dore

Supervisory Committee

The City University of New York

Abstract

ELEMENTS OF STYLE: MATERNAL AND CHILD CONTRIBUTIONS TO THE REFERENTIAL AND EXPRESSIVE STYLES OF LANGUAGE ACQUISITION

by

June Hampson

Adviser: Professor Katherine Nelson

The present longitudinal study examined potential precursors of the 20-month referential and expressive styles. The main hypothesis of the study was that individual differences are the result of an interaction between child preferences and maternal input variables. Alternative hypotheses that stylistic differences might be merely the unfolding of the child's cognitive style, or related to precocious language development, or purely the result of maternal input were also tested.

36 white, middle-class mother-child dyads were selected from a pool of 45 subjects on the basis of the size of the child's 13-month vocabulary (assessed by maternal questionnaire), and divided into a group of early talkers (vocabularies > 14 words) and another of late talkers (< 8 words). Dyads were videotaped at 13 and 20 months, and distributed into the relevant cells of a 6-cell matrix design according to

maternal emphasis upon object or person references and the composition of the child's 13-month vocabulary. While the size of the child's 13-month vocabulary was related to maternal language measures, children's initial stylistic tendencies were relatively independent.

The referential and expressive styles evidenced at 20 months were significantly related to both prior maternal and child measures. An early emphasis on common nouns or non-nouns predicted 20-month style. The referential style was positively associated with maternal use of nouns and descriptions, and negatively associated with the use of performatives and conversational devices. However, interactions between 13-month maternal and child variables were better predictors of 20-month style than either measure alone.

Interaction variables were also the best predictors of measures of maternal language at 20 months. Mothers and children are better predictors of each other at 20-months, but that is the result of bi-directional effects.

Qualitative analyses of a subsample of children revealed that referential and expressive children follow different routes to multiword utterances, and that the expressive strategy is a viable alternate route.

Finally, inconsistencies between motherese findings may be attributable to a failure to take individual differences into account, since maternal input had a differential effect depending upon the strategy adopted by the child.

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To my committee members, Joseph Glick and John Dore, I must also extend my thanks, and not merely for their part in the present work. During my years at the Graduate Center they have provided many hours of stimulating discussion, and each has contributed to my intellectual development in significant ways.

My readers, Bambi Schieffelin and Elena Lieven ensured that the defense itself was an exhilirating experience. They raised many issues which I hope to address in the future and pointed to new avenues of research related to the current study. I would like to take this opportunity to thank them for the time and effort they expended, but I am particularly grateful to Elena Lieven for agreeing to participate in an unscheduled dissertation defense during a brief visit to the United States. Her

presence in the defense made the experience all the more memorable for me.

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Prior to joining the Graduate Center, I was privileged to be taught statistics at City College, CUNY by John Antrobus, who also introduced me to Suzanne Salzinger. Suzy generously supervised my first research project, an undergraduate honors thesis, and taught me a great deal in the process. I am grateful to both Suzy and John for their contributions to my education, for their continued interest in my work, and also for their friendship.

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This study would not have been possible without the cooperation of the mothers and toddlers themselves. I would like to take this opportunity to thank each

mother for generously welcoming me into her home and allowing me the opportunity to study her child's language and their interaction. Even after hours of tedious transcribing, the children are still a joy to behold.

Writing this acknowledgment has provided me with a long-awaited opportunity to express my gratitude to my own parents. I have realized from observing the mothers in this study the amount of energy and effort that is expended in everyday interaction with a small child. I wish to thank my mother, Elizabeth Hampson, who unstintingly gave of herself while rearing three children. I am grateful to my father, Robert Hampson, for his belief in the importance of education, and his committment to making it possible for his children to pursue their educations to the best of their abilities. To both , I extend my love and thanks.

My sister, Diane N. J. Hampson, being several years younger, is probably not aware of her influence. However, I credit Diane with being the prime instigator in my choice of career. Observing and enjoying her early years directed my interests towards child development, and language acquisition in particular. Her observation at 2 years that the raindrops on the washing-line looked "like a string of pearls", must have had a profound effect upon me, because I remember it to this day.

Robert Gavin Hampson, my brother, has always been an inspiration to me, in the way that only an older brother can be. During my teenage years he provided an intellectually stimulating environment and a model to emulate. After a separation of many years, punctuated by brief reunions, it was wonderful to have him here and

to be distracted by his ideas and poetry during the last few days before the defense. Our discussions about language acquisition seem to have inspired him too:

Atlantic City, N. J.: Honey

Homer nods
while the other kid
splutters
his words,
signals
with fingers in the air.

"Honey, speak slow
if you wanna talk.
Take your time."

"Talk?" fingers
stop waving
head falls forward,
mouth lands
on mother's nose.

robert hampson

Finally, and certainly most importantly, there is Bhaskar Sengupta, whose ultimate threats provided the impetus to finish, when procrastination might have been the order of the day. Bhaskar, for your 'significance', 'reliability' and 'goodness of fit', this dissertation is dedicated to you. Thank you for being there in every way.

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CHAPTER I

INTRODUCTION

In recent years it has been widely accepted that individual differences in the process of acquiring language exist. However, the important theoretical implications of this finding have been largely ignored. Attempts to explain the phenomenon tend to raise the age-old question of environmental influences versus innate predispositions, and cross-sectional correlational data have been unable to address the issue of causality. The present longitudinal study seeks to examine maternal and child contributions to the development of the referential and expressive speech styles, and attempts to unravel the issue of the direction of control.

I.1 Discovery of Individual Differences

The relatively late emergence of the finding that there is no universal process of acquiring language is testimony to the methodological constraints imposed on data by theoretical preconceptions. During the 1960's, researchers interested in early language development (e.g. Brown & Fraser, 1964) were influenced by Chomsky's work and sought to characterize the child's developing grammar. Assuming a universal process based on an innate capacity, such researchers tended to study small samples and to ignore the single-word phase of development. In addition, the

universalist position justified the exclusion of subjects with poor articulation.

However, during the 1970's the focus of attention moved from syntax to semantic development, in response to a renewed interest in cognitive development in general. Since even Chomsky had found it necessary to expand his theoretical model to include semantics (1965) and surface structure elements (1970), developmental psychologists interested in language acquisition began to supplement linguists' explanations for the acquisition of grammar with their own. Relying upon the rich interpretation of context, investigators such as Bloom (1973) shifted attention to the one-word period, and attempts were made to relate the child's emerging cognitive and linguistic capacities.

In addition, there was an upsurge of interest in the actual language that a mother uses when speaking to a young child. Chomsky's assumption of a powerful innate language acquisition device which could handle degraded input, led to a number of studies of maternal speech in efforts to refute his claims. Brown and Bellugi's (1964) observation that adults often provide expansions of children's utterances was experimentally tested as a plausible language teaching device (Cazden, 1965). The experiment generated interesting results although Cazden's hypothesis was not supported. It was found that a modelling condition, which provided semantically appropriate responses to children's utterances led to accelerated language development. During the 1970's 'motherese' was extensively documented (e.g. Moerk, 1974; Reichle et al., 1976; Seitz & Stewart, 1975; Snow, 1972, 1977), and found to be a sociolinguistic skill which even 4-year-olds evidence (Shatz & Gelman, 1973). The

existence of motherese has been well established, but its effectiveness as a teaching device is in sharp dispute. The study of stylistic differences in language acquisition is relevant to resolving this dispute.

Once researchers began to focus on semantics and the social context, several (e.g. Bloom, 1973; Nelson, 1973;) began to report chance findings of variation in strategies for acquiring language. Nelson (1973) studied the presyntactic stage of development in eighteen children over the period from 12 months to two-and-a-half years. A major finding of the study was the existence of two distinctive approaches to the task of learning language, which revolved around the type of words the children used and a preference for single words or phrases. Nelson found that most children adopted a 'referential' style, with early vocabularies containing primarily object names (i.e. nouns). For these children there was clearly a one-word stage of development. However, the 'expressive' child tended to use a large number of phrases which were social routines (e.g. "I want that"). This resulted in vocabularies containing many pronouns, embedded in unanalysed formulae.

At around the same time, Bloom (1973) proposed that there were two routes to two-word speech, with some children adopting a pivot-open construction and relational terms, while those children that appeared more 'referential' in their vocabulary were more likely to use subject-verb-object sentence constructions. Like Nelson, she found greater reliance on pronouns in the relational group, and more imitation.

In at least two studies, individual differences have emerged only when

researchers have been compelled to reject their theoretical assumptions by the resistance of their data. Unable to accept that more than 50% of Minh's utterances were 'uncodable', Peters (1977) eventually came to the conclusion that by imposing a one-word coding scheme on her data she was distorting it. Once Peters accepted that Minh was indeed attempting to produce sentences, such as "I like read Good Moon Night" [i.e. Goodnight Moon], she found up to five times as many utterances became intelligible. Similarly, Branigan (1977) found that he was unable to categorise all of the data in his study of children's syntactical development between single word and multiple word utterances, until he recognised the existence of 'compressed multiple word utterances'. He concluded that some children were segmenting adult speech into whole phrases as well as words, and producing utterances such as "I don't know where it is", which Branigan initially treated as unanalyzable babble. Branigan eventually extended his coding scheme to incorporate this new category, for phrases uttered rapidly with no pause between the words. In addition, he found that such 'compressed sentences' were distinct from normal multi-word utterances in other ways. The use of 'I', wh-words, contractions, articles, negatives and forms of the verb 'do' were virtually unique to compressed sentences.

I.2 Description of the Referential and Expressive Styles

Further systematic investigation of the phenomenon (Bloom, Lightbown & Hood, 1975; Bretherton, McNew, Snyder & Bates, 1983; Dore, 1974; Horgan, 1980; Snyder, Bates & Bretherton, 1981) has revealed consistency in the findings, and a

profile has begun to emerge of two extreme styles. In this study, following Nelson (1973), I will refer to these as the 'referential' and 'expressive' styles. The primary distinction between these two patterns of language development is the lexical content of the child's speech. Children adopting a referential strategy develop early vocabularies consisting mainly of common nouns, while expressive children have more diverse vocabularies, including more personal-social words (e.g. "hi", "no", "please"). In addition, expressive children use a large number of social routines or formulae, and appear to be attempting to produce whole sentences, such as "Don't do that", with the result that their vocabularies contain more pronouns. The expressive child may use a "dummy" term to fill out the intonation pattern of a sentence (Bloom, 1973), and articulation is usually poor. Understandably, expressive children were rarely selected as suitable subjects for early language studies.

Camarata and Leonard (1986) have suggested that semantics may interact with phonology. In a study of acquisition of novel words, matched according to consonant and syllable structure, 2-year-olds pronounced object words more accurately than action words. Camarata and Leonard hypothesize that the difference is a result of greater semantic complexity for action words as opposed to object words. Their analysis may be relevant to the differences in articulation found between the referential and expressive styles.

Most investigators have developed a dichotomous classification system to describe individual differences. Bretherton, McNew, Snyder and Bates (1983) refer to the use of 'analytic' versus 'holistic' processing strategies, contrasting children whose

language is characterized by unitary lexical items with children who attempt to produce full sentences. Similarly, Horgan (1980) describes the expressive-referential distinction in terms of noun 'lovers' and 'leavers', while Dore (1974) documents the different strategies used by 'word-babies' and 'intonation-babies'. Most researchers stress, however, that such descriptions identify children who represent opposite ends of a continuum, since many children utilize both strategies. The intrinsic value of this line of research is, therefore, not to categorize children, but to examine those children who demonstrate clear stylistic preferences in order to understand the two strategies, which are more difficult to perceive when they are merged.

I.3 Crosslinguistic Evidence

Further, the crosslinguistic study of language acquisition has resulted in reports of individual differences which are consistent with the description of referential and expressive styles already presented. Stern and Stern's (1928) description of the difference between their son's acquisition of German and their older daughter's language acquisition, may be interpreted as one of the earliest reports of individual differences. They noted that their son inserted a nonsense syllable /e/ between the words of his utterances. Mills (1985) suggests that, since this occurred during the stage when the child was omitting functors and articles, it is possible that the child was inserting /e/ "to preserve the rhythm" of the utterance. Clark (1985) discusses individual differences in children acquiring French and cites studies by Leroy (1975) and Lightbown (1977). Leroy found that one child used highly variable

word order while another strictly adhered to the canonical SVO word order in French, and had clearer articulation. Clark comments,"the variable-order child seemed to rely on intonation as a segmentation device ... and produced adult-like intonation sequences with few identifiable words" (p. 755). This description could equally be applied to an expressive child learning English. Lightbown (1977) found that one of the children acquiring French in her study was a pronominal child while the other emphasized nouns.

However, perhaps the most interesting report of individual differences is Okubo's (1981) description of different strategies employed by two Japanese children in the transition from single word to multiword utterances, which is cited by Clancy (1985). Japanese is a language in which pronouns tend to be acquired late because of a cultural preference for referring to others by kinship terms or proper nouns. In addition pronouns are entirely optional, and Clancy reports Ide's (1977) comment, after observing 1 to 6 year olds in a nursey school, that "a dozen Japanese children can play together for half an hour at a time without using a single first or second person reference" (p. 452). In such a situation, therefore, it is particularly striking to find a report of individual differences between a brother and his younger sister. The first-born boy at 2 years was noun-dominant while his sister at the same age was verb-dominant. The boy expanded the noun phrase using modifiers such as color, while the girl had a greater variety of verbal inflections. Their differing emphasis also had ramifications for two-word constructions. Both children adopted a pivotal strategy but the verb-dominant girl used people's names and *kore* (this) for fixed

pivots, while the boy used attributes of objects (e.g. *akai,* red). Moreover, within the category of nouns the boy labeled objects, while the girl had a much higher frequency of references to people (Okubo, 1981). In discussing these findings, Clancy (1985) comments that different approaches to language acquisition may be fostered by different social contexts, pointing to the different social configurations for a first-born and second-born child. The existence of consistent findings across such diverse languages indicates that individual differences may be a universal phenomenon.

I.4 Implications for Theories of Language Acquisition

While the existence of individual differences is now well established, the full significance of the finding has not been acknowledged. Even if individual differences are merely a transient phenomenon, reflecting the use of two different strategies to acquire language, any model to account for the acquisition of grammar will either have to encompass both routes, or provide an alternative explanation for the phenomen which is consistent with the model. The finding of individual differences, therefore, may place constraints on theories for the acquisition of grammar. Linguists and psycholinguists, (e.g. Gleitman & Wanner, 1982) tend to assume a universal process based on a largely innate predisposition, and ignore the variability in children's early strategies. Awareness of the complexity of the adult grammar leads them to consider what Bruner (1983) has called 'the pragmatic run-up to language' as largely irrelevant. As a result, their attempts to explain language acquisition seem doomed to be merely descriptions of the nature of the language system once it has

fully emerged.

Hoff-Ginsberg and Shatz (1982) have recently taken to task developmental models for language acquisition based on social processes, pointing out the need for constraints regarding matching mental mechanisms. While their point is well-taken, the individual differences literature implies that it may be necessary to consider variations within models. If theoretical constraints fail to accommodate relevant data the resultant model may be simply an exercise in logic.

I.5 Status of Motherese

In the 1980's some researchers are again considering the major challenge in language research to be the problem of explaining syntax. With the emphasis once more on the acquisition of linguistic structure, many researchers are disillusioned with attempts to account for language acquisition in terms of maternal input. Bates et al. (1982) provide a lengthy review of studies attempting to assess the relationship between adult input and child language, and conclude that "the case for externally driven structural effects on language development is not very good" (p. 64). Similarly, Shatz (1982) characterizes communication-based approaches as either analog (e.g. Bruner) or dialogic (e.g. Snow) approaches. Both, she feels, have failed to provide more than mere evidence that the environment is structured in such a way that the theory is plausible. However, she points out that such 'existence proofs' fall far short of demonstrating a causal relationship, and criticizes both models for the vagueness with which they are presented. She reports three studies purportedly

designed to test specific components of a communication-based approach. Unfortunately, Shatz' model of an 'omniscient mother' is a misstatement of the motherese position, and, by taking apart the phenomenon, she trivializes the theory she is purportedly testing. As a result, her discussion does not therefore address the significant issues.

In the current climate, when many researchers are embracing innatist explanations, the strategy adopted by expressive children demands a re-evaluation of the role of imitation. Chomsky's (1959) attack on behaviorist explanations for language development discredited the process of imitation on the grounds that it could not account for the syntactic structure of language that Chomsky had revealed. More recently, Bates (1979) has reintroduced imitation as a potential mechanism, and the concept of imitation has become more sophisticated. For example, Bretherton et al. (1983) discuss the need to examine the content, context and language level associated with imitation, if we hope to understand its role. The initial stages of productive acquisition are characterized by Marateos and Chalkley (1980) as a "mixture of general rule and memorized instance" (Marateos, 1983, p. 762). Bates, Bretherton and Snyder (1988) have suggested that inconclusive findings regarding the role of imitation in language acquisition may be explicable in terms of individual differences. While referential children may imitate only words that they have already mastered, the expressive child may use imitations which are more grammatically advanced than the childs' spontaneous speech. Imitation as a process, therefore, may play no role in the acquisition process for the referential child, but may contribute to

the language acquisition process for expressive children. Bates et al. cite Snow's (1984) proposition that two different types of analysis are involved in language acquisition: analysis for understanding and analysis for reproduction. Bates et al. suggest that expressive children may utilize imitation in attempting to 'sound like other people'.

As a direct consequence, maternal input cannot be considered unimportant. Clark (1974) has described one child's strategy of incorporating unanalyzed portions of maternal speech. She has argued that this strategy played a part in determining the nature of the child's linguistic rules. Similarly, Snow and Goldfield (1983) have documented the role played by recurrent, routinized utterances in a child's strategy for language acquisition. While it has been generally accepted that a child's lexicon must be learnt from the language the child hears, many researchers (Bates et al., 1982; Gleitman et al., 1984; Shatz, 1982) have concluded that input plays a small role in the acquisition of grammar. However, if imitation of whole utterance segments is a viable strategy for some children, it seems that Nelson (1981) was correct in proposing that the distinction between words and sentences has been over-exaggerated. Indeed, Bowerman (1982) has recently argued that certain types of words are initially used correctly in an unanalyzed manner, but require later analysis.

If imitation is accorded a potential role as a strategy for acquiring language, maternal input is implicated in the process. Initial findings that 'motherese' is simpler, more redundant and related to 'the here and now', were met with enthusiasm since these characteristics appeared to make the child's task simpler than

Chomsky had assumed, and reduced the need to rely totally upon an innate language acquisition device. However, researchers' attempts to measure the effects of motherese have led to a controversy regarding the interpretation of results. While Furrow, Nelson and Benedict (1979) found syntactic and semantic simplicity in maternal speech correlated with improved child language nine months later, Newport, Gleitman and Gleitman (1977) claimed that most differences between motherese and normal adult conversation are inconsequential for child development. Further, Newport et al. concluded that universal aspects of language are insensitive to input variation, and that the language capabilities of the child unfold in a semi-autonomous manner. Gleitman, Newport and Gleitman (1984) have re-analyzed their data in response to Furrow et al.'s (1979) criticism that their statistical analysis was flawed because it was based on incorrect assumptions regarding the effects of motherese. However, as Furrow and Nelson (1986) have pointed out, the re-analysis does not correct the initial error, and so it is not surprising that Gleitman et al,'s 'new' results are substantially the same. In addition, Gleitman et al. (1984) reveal that the model of motherese which they are attacking is merely a straw-man. They describe an extreme version of the motherese hypothesis which implies that language acquisition is totally environmentally-driven, based on a simple modelling mechanism. It is unlikely that any proponent of motherese would subscribe to such a position, which fails to provide a role for the child's semantic interpretation. Bates et al. (1982) have suggested that difficulty in demonstrating the effectiveness of motherese may be the result of threshold effects. In addition, I would like to suggest that until researchers stop ignoring individual differences, it may be difficult to

demonstrate motherese effects, which may vary depending on the match between the child's acquisition strategy and the mother's linguistic style. The significance of 'motherese' may be clarified when we have a fuller understanding of individual differences in language acquisition which may interact with measures of maternal behavior. The present study will attempt to address this question by dichotomizing the sample and examining differential associations between maternal language and complexity of child language at 20 months.

I.6 Individual Differences across Levels of Language Development

Perhaps the major significance of the individual differences phenomenon is evidence indicating that differences may persist, although obviously in a modified form. Nelson's initial study, which followed children to 30 months, found that children identified as referential, based on their first 50 words, continued to have larger vocabularies at two-and-a-half years. An early form of the distinction has been identified in children as young as 13 months (Snyder et al., 1981). Horgan (1980) found that early 'noun lovers' continue this preference through the stage of grammatical development, and concentrate on expanding noun phrases, in contrast to 'noun leavers' who emphasize verb morphology. Starr (1975) found similar structural and functional relations between single word preferences and two-word sentences. In addition, Horgan (1980) claims that differences can be found in passive constructions even at age 14, while Goldfield and Snow (1984) claim that the differences persist into adulthood, demonstrated by different approaches to learning a second language.

I.7 Potential Explanations for Individual Differences

The present study examines maternal and child precursors to individual differences, in an attempt to assess their relative contributions. Several different theories have been suggested to account for the origin of individual differences. Explanations which have been offered have ranged from biological hypotheses to purely social ones. Biological explanations tend to focus on the maturation process. A neurological explanation has been suggested (Peters, 1977; Bates et al., 1979) which relates stylistic variation to asynchronous maturation of the hemispheric brain functions. The right hemisphere is currently believed to specialize in tasks requiring holistic analysis, while the left performs more analytic and sequential processing. Moreover, Bates et al. (1988) have noted the striking similarities between the referential and expressive approaches to language and the classic symptoms of Broca's and Wernicke's forms of aphasia. They hypothesize that asymetrical development in these two areas of the left hemisphere may play a role in producing stylistic differences.

It has also been suggested that individual differences may reflect the child's own cognitive approach to conceptualising the world (Bloom and Lahey, 1978). While this explanation also locates the source of individual differences within the child, it leaves open the possibility that environmental forces play a role in how the child comes to conceptualize the world.

Nelson (1973) makes the role of environmental correlates more explicit. She proposed that children using referential and expressive strategies have arrived at

different conclusions regarding the function of language based on their experience with language in their environment, and some evidence supports this. A relationship between form and function has been demonstrated. In a word-learning study, Ross, Nelson, Wetstone & Tanouye (1986), found that those children identified as expressive based on pronominal usage were more likely to use personal and social functions than referential children. Furrow (1980) found similar functional preferences in a naturalistic study of 2 year-olds, and a recent study of individual differences in relation to social networks (Hampson, 1988) provides further support not only for the hypothesized relationship between early language form and function, but also attests to the impact of environmental variables. In a study of ten 22-month-olds during a half-hour free-play session with their mothers, noun usage within both spontaneous and responsive speech was positively correlated with the use of mathetic functions and negatively with the use of pragmatic functions. Specifically, spontaneous noun usage, which was adopted as the main criterion of referential style, was positively and significantly correlated with the functional use of language to name and refer to objects ($r = .87$, $p < .01$) and negatively with the child's use of language to express wants, desires and feelings ($r = -.72$, $p < .03$). Moreover, a high proportion of spontaneous nouns correlated positively with a high proportion of adult contacts in the child's social network ($r = .83$, $p < .01$) and negatively with a large number of peer contacts ($r = -.75$, $p < .02$). This finding supports the hypothesis that differences in the social function performed by language may result in differences in the psychological function of that system within the child.

The most comprehensive account of the many differences between the mothers of referential and expressive children is included in Klein's (1980) dissertation. She found that mothers differ on measures such as their use of noun tokens, amount of object play, self-repetitions and in particular, their reference to objects ($F = 79.64$, $p < .0005$). Furrow and Nelson (1984) also found statistically significant differences between mothers of referential and expressive children in terms of their references to objects and people. Mothers of referential children are more likely to refer to objects, while expressive children have mothers whose referencing behavior is more balanced. Both of these studies were based on concurrent samples of mothers' and children's language. In a related longitudinal study, Goldfield (1985) examined the relationship between children's play behavior, maternal language and children's language style. She videotaped twelve subjects at 12, 15 and 18 months in a play context with their mother, and during a solitary play period, while their mothers were instructed not to participate. The determination of stylistic differences was based on a diary of each child's first 50 words. Goldfield found that the best predictor of referential style was a child who used toys to solicit maternal attention combined with maternal provision of labels and descriptions. Stability of maternal behavior over the 12 to 18 month period was also found.

Other attempts to relate environmental variables to individual differences have produced less conclusive results. Nelson (1973) found that intrusiveness on the part of the mother tended to be associated with slower language acquisition on the part of the child, and was negatively related to the referential style of language

acquisition. McDonald and Pien (1982) have characterized mothers as either attempting to control their children's actions with commands, or attempting to elicit conversational participation by questioning, based on a functional analysis of mothers' speech to two-and-a-half and three-year-old children. Stability along this dimension has been established by Olsen-Fulero (1982), who has suggested that mothers' intentions may be related to the referential-expressive distinction. However, the hypothesis that questions as opposed to commands are the controlling variables in producing referential and expressive children has met with only partial support in recent research. Dellacorte, Benedict and Klein (1983) found that in a caretaking situation, mothers of referential children used more descriptions while mothers of expressive children used more prescriptions. However, in a study of free-play, no relationships were found between the child's spontaneous language style and maternal use of questions or commands (Hampson, 1988), although use of nouns by the child in responsive speech was related to maternal use of 'test' questions. The only function of the mothers' language which was consistently related across studies and across contexts to spontaneous referential style was maternal use of descriptions.

Similarly, while some reports (Klein, 1980; Longtin, 1984) indicated that referential and expressive mother-child dyads might be matched in their preference for nominal or pronominal forms, other studies (Furrow and Nelson, 1984; Dellacorte, Benedict and Klein, 1983) have failed to replicate these findings. In the Dellacorte et al. study this lack of differentiation is attributed to the caretaking context and it is argued that unstructured free-play contexts would be the optimal situation for

variation to emerge.

To summarize, it appears that there are clear environmental correlates to individual differences in terms of maternal referencing behavior. This is supported by consistent findings that referential style is associated with maternal use of descriptions. However, relationships between maternal noun/pronoun ratios and maternal intrusiveness are not conclusive, and may be a function of contextual variation. Whether the environmental correlates are sufficient to account for the variability found, is one of the questions that this study seeks to answer.

I.8 The Issue of Direction of Control

In attempting to relate maternal and child measures most studies have measured concurrent variables. However, Lieven (1978) has raised the issue of the direction of causality, which plagues correlational studies. Lieven found that the two mothers she studied were prone to respond differently to their daughters. Kate, who spoke clearly about objects in her environment, had a mother who frequently responded to her utterances with questions and expansions. In contrast, Beth, the more expressive child, received more corrections of her utterances and unrelated conversational formulae in response. Lieven also analyzed her own responses to the two children and concluded that the differences between the two mothers reflected the influence of the children's speech on the adults.

The present longitudinal study was designed to address the problem of the direction of control in examining the development of individual differences in

language acquisition. This study examines whether a) maternal referencing behavior at 13 months, or b) child vocabulary at that age, or c) an interaction between the two, predicts individual differences in language acquisition style at 20 months. In addition, the study examines stability in maternal referencing throughout this period and across situational contexts, and the process of development of the child's style. Although the design of the study attempts methodologically to separate maternal and child input, the study is not based on a naive theoretical belief that it is in any way possible to separate genetic and environmental effects, or cognition from culture. As notable psychobiologists such as Gottlieb (1983) and Schneirla (1972) have been at pains to point out, no organism ever exists independent of an environment, and the 13-month-old child's development has certainly been influenced by previous interactions with the mother. However, since individual differences are most pronounced at around 20 months, it is of interest to see if any of the variability which already exists at the very early stage of vocabulary development (Snyder et al, 1981) is related to 20-month style, and whether it can be attributed to specific factors other than maternal influence. While the focus of the study is maternal input, it should be acknowledged that children interact with other people, who also have a potential to influence the child's language progress.

I.9 Evidence for Stylistic Strategies

Throughout the literature on individual differences in early language acquisition an assumption has been made that such stylistic variation is actually

indicative of different acquisition strategies. Several of the studies cited previously provide evidence to support such an assumption. For example, both Nelson (1973) and Bloom (1973) found consistent differences between referential and expressive children which persisted. Later researchers have related the referential and expressive styles in early speech to different strategies in later grammatical development. For example, Starr (1975) found functional continuity between single words and two-word sentences. Those children who used single words to refer to objects later produced sentences expressing object modifications. Stative sentences, however, which expressed the child's desire for an object, were negatively related to single-word object references. Starr concludes that two-word utterances are not constructed merely by combining features of earlier one-word utterances, but respect the child's functional emphasis.

Horgan (1980) describes differences at 5 years between children characterized as referential or expressive based on their early language. Using an experimental paradigm which required children to describe the location of an object hidden beneath felt pieces of different shapes, colors and sizes, she found that referential children referred to all three features, but failed to use a redundancy strategy. For example, when all three pieces of felt were red, the child might still refer to the location as "under the little red square". In contrast the expressive children tended to name only two features, but were unable to provide a combined description using just one noun phrase. For example, they might say, "It's little and it's square". Moreover, Horgan (1980) reports differences in passive constructions for children between 2 and 14

years, depending on their earlier stylistic preference.

In addition, Bates et al. (1988) have recently reported a series of twelve studies with 27 children from 10 to 28 months, in an attempt to trace the development of language from first words to grammar. They claim that their results partially support a two-strand model, although they claim that at least three factors are required to account for their longitudinal data. They point to dissociations between comprehension, analyzed production and rote production. Bates et al.'s final conclusion is that "the strands of dissociable variance observed in early language development reflect the differential operation of universal processing mechanisms that every normal child must have in order to acquire a natural language" (p. 267). While rejecting innate vertical modules of the sort posited by Fodor (1983), they opt for horizontal faculties, searching for the commonalities between language and other aspects of cognition. Moreover, they hypothesize that the child constructs domain-specific language modules, and that individual differences provide information regarding universal mechanisms of language learning. While this model also requires an innate component, or capacities shared with other cognitive tasks, this suggestion differs from other innatist models of language acquisition to be discussed below. Bates et al.'s conclusion is similar to that offered by Nelson (1975), in stressing the need for an eventual balance of the two strategies. Nelson suggests that the referential style focuses on the lexicon, while the expressive focuses on relations, and that the two approaches are complementary.

Throughout the literature the argument being offered is that stylistic

differences are important because it is only by examining these two different strategies in extreme exemplars that it is likely that discoveries will be made about how children acquire language. It is instructive to look at the extremes, because it is more difficult to see the processes when the two strategies are balanced in the same child. The suggestion that stylistic differences are indicative of different strategies will gain further support if there is evidence in the present study for continuity over time and across contexts.

I.10 Form-Cause Explanations

If such strategies do exist, as coherent packages which characterize children from their earliest comprehension up to the point of multiword utterances, there are several candidate explanations for their existence. An emphasis on the lexicon in contrast to relational meaning, combined with a functional emphasis on talking about the world as opposed to social interaction have both been suggested by Nelson. Bretherton et al. (1983) suggest that analytic versus holistic strategies account for the different performances of referential and expressive children. Several researchers have commented that the referential style requires later synthesis in order to produce multiword utterances, in opposition to the analysis that the expressive child must apply in order to break apart routinized phrases. Referential children may be focusing on denotational meaning, relating concept to word and intension to extension. By so doing the child may have a well-developed understanding of paradigmatic relations. The expressive child, by producing whole utterances has a potential opportunity to

analyse distributional properties. In addition, it is possible to contrast the referential and expressive styles in terms of Austin's (1962) analysis of the speech act. While the referential child produces a locution, illocutionary intent is limited. In contrast, the expressive child is attempting to express illocution without mastery of the locutionary system. In all of the above characterizations, it is clear that in order to attain the plurifunctional mature language system the child must master both halves of the dichotomy.

I.11 Implications for Models of Language Acquisition

This point brings up the issue of whether individual differences have implications for the acquisition of the fully developed grammatical system. First, it should be noted that language acquisition is not simply a matter of acquiring a grammar or cognitive device in order to express proposition-like rationality. Children also have to acquire communicative competence, and the expressive style may be particularly relevant here. However, to return to the question of the acquisition of grammar, it appears that there are currently two broad types of innatist theories: parameter-setting and weighted distributional models. Those that operate according to some parameter-setting device, posit that the input selects from within a range of optional constraints, with each selection limiting future options until the system has closed in on the target language. The opposing model builds on a frequency-sensitive mechanism, with the input providing cue strengths which weight the choices in favor of the target language. This mechanism operates on a probability basis with early

errors slowly being eradicated as cue strength diminishes over time and with repeated exposure to correct input. It is possible for this second type of model that the innate component is not language-specific. Bates and MacWhinney (1987) have provided a model of this type which presumably is compatible with the results of Bates et al.'s (1988) longitudinal study of individual differences.

For the first type of model, individual differences appear to provide inconsistent data, unless it is assumed that the innate mechanism is operative at a much later stage. Otherwise, children demonstrating stylistic extremes might set their parameters in such a way that an incorrect set of options would be selected. The early stages of language acquisition will have to be either written off as irrelevant, or seen as a necessary process, albeit with differing routes, in order for the input to start the system. For a probability model, individual differences present less of a problem. They can be interpreted as reflecting the early operation of the weighting mechanism, if there is evidence for concomitant weighting in maternal input. However, Bates and MacWhinney (1987), appear to prefer placing differences in perceivability of cues (leading to individual differences), within the child, perhaps because Bates et al. (1982) tend to reject the role of maternal input. The current study provides data relevant to this issue.

Since both strategies will have to come into play before the system can be effective, there will be a stage when the two styles balance each other out. There is evidence that such a process occurs, with referential children increasing their pronominal emphasis with higher MLUs, and expressive children acquiring more

nouns at later stages (Nelson, 1975). Such evidence, however, does not rule out the possibility of heterotypic continuity, with early stylistic differences persisting in some other form, with consistent associations to differences in other areas of language development at later stages.

For both general models the early period can be viewed as the arena in which the input starts the system. Both types of model pay little attention to how that happens; that is, whether the child's innate mechanism is activated by mere exposure or whether storing and production of language by the child is a necessary precursor. Since models are designed for computer simulation, the emphasis is on the possibility of extracting rules and regularities from the input, not the matching of input to the conceptual system and exemplars in the world, nor the pragmatic understanding of illocutionary force.

I.12 Aim of the Study

While the study has been designed to allow the examination of multiple hypotheses, it is based on a Vygotskian approach. The mother-child dyad is viewed as a system of interaction and the child's 20-month language style is expected to be an outcome of an interactional history. It is proposed that both partners will have contributed to the development of their style of interaction. The child's contributions may be to modify the mother's behavior mainly on the basis of responsiveness. The mother's influence on the child may be more directly related to the mother's conscious beliefs about her role as the primary 'teacher' of language to the child, since

some mothers do appear to adopt a very didactic style and to have clear views regarding the appropriate way to talk to a child of this age. The mother may also have a less conscious impact on the child's language, for example, by simply not providing sufficient labels, by her own functional emphasis, or by the degree to which the mother's language makes the situation easily comprehensible to the child. A recent study by Baldwin and Markman (1989) has demonstrated that labelling objects increased infant's attention to them, and that labelling was more effective than merely pointing. Moreover, it was found that the effect of labelling persisted beyond the time of its occurrence: infants gazed longer at the labelled objects during a subsequent play period when no labels were provided. These results clearly indicate that language can increase infants' attention to objects.

While it is proposed that the child's language style is an outcome of an interactional history, this suggestion does not rule out the role played by the child's own interpretation. It is believed that the child's linguistic style is the result of a truly interpersonal process, and is not simply a product of the influence of the mother. The child as the less mature partner is becoming enculturated through participation in cultural practices, but the child is a negotiating, interpreting partner. This study examines precursors of the referential and expressive styles in terms of features of the child's own early vocabulary, maternal referencing behavior, and their combination. Specifically, it is hypothesized that the referential style of language development at 20 months is the outcome of an interaction between the child's 13 month preference for common nouns, and relevant maternal language measures.

Maternal variables which have been implicated by earlier studies include maternal object referencing, maternal emphasis on nouns and maternal use of descriptions. All three are examined in this study as potential interaction variables. In contrast, children who do not emphasize nouns in their early vocabularies and who have mothers with an orientation towards people rather than objects are expected to have a more expressive style of language development. Alternative hypotheses to be examined are that stylistic variations at 20 months are the result of earlier maternal input alone, or that they result simply from the child's unfolding cognitive style, independent of maternal input.

I.13 Summary

Individual differences in styles of language acquisition have been well-documented and evidence has also emerged from crosslinguistic studies to attest to the stability of the phenomenon. However several issues related to the existence of stylistic variation are far from resolved. The origin of individual differences is still open to question. Whether styles reflect biological propensities, environmental influences or an interaction between the two, has not been determined. In addition, where maternal input has been implicated, it is not clear whether the direction of control was from mother to child or vice versa.

While there is evidence to indicate that styles persist, it remains to be seen whether children are stable from their earliest tendencies, when language is emerging, to the point when style is most pronounced, at around 20 months. Also the question

as to what form the variation takes at later stages has not been resolved. This raises the issue of whether styles translate into coherent strategic bundles or strands. If children are differentially utilizing two strategies, it is important to consider what are the potential implications for a theory of the acquisition of grammar. Moreover, since acquiring a grammar is not synonomous with language acquisition, but represents only a subset of the total phenomenon, individual differences may have a potential significance for other aspects of language acquisition.

Finally, if individual differences do represent variation in language acquisition strategies, and if they are not simply the result of maternal input differences, it is of interest to examine the relationship between motherese and individual differences. An interaction between stylistic variation and maternal variables may have produced the disappointing motherese results which have driven many researchers to adopt a more innatist account for language acquisition.

I.14 Summary of the Research Design

The purpose of the present study is to examine precursors to the referential and expressive styles of language acquisition at 20 months in terms of the child's 13-month language variables and maternal language measures at that age. While the study has been designed to permit testing of alternative hypotheses, the main hypothesis is that 20-month style reflects an interaction between noun emphasis by the child at 13 months and maternal emphasis on objects as opposed to people. Maternal noun versus pronoun emphasis is also assessed. In addition, a functional

analysis of maternal utterances explores the possibility that mothers of referential children talk about the world, while expressive mothers use language to interact and entertain. That 20-month style might be independent of maternal input, or simply the result of earlier maternal input are alternative hypotheses being examined.

Forty-five mother-child dyads participated in the study. The sample was large in order to fulfill two different aims. First, it was hoped that by selecting a subsample of 12 children based on extreme criteria (see below), good examples of the referential and expressive styles would be identified. Secondly, it was considered important to have a large enough sample for statistical analysis of overall trends in order to complement the qualitative analysis of data from individual children.

Dyads were videotaped in their own homes at 13 and 20 months in two contexts: a free-play session and a meal session. In addition, at 13 months each mother was administered a detailed questionnaire regarding the size and composition of the child's productive and receptive vocabularies. A subsample of 12 subjects was also observed at 15 months, 16 months and 18 months.

Subjects were allocated to the relevant cells of a six-cell matrix design based on two different criteria. First, children were divided into a group of early talkers and another group of late talkers, based on maternal report. The group of late talkers was included in the study since it has been suggested that referential and expressive styles might reflect differences in rate of language acquisition rather than stylistic differences. Inclusion in the group of early talkers was based on a productive vocabulary of at least 15 words at 13 months. Those in the late talkers' group had

productive vocabularies of seven words or less. Within the early talkers' group, children were further divided depending on the proportion of common nouns within their productive vocabularies. The referential group had 65% or more common nouns in their 13-month vocabularies, while the expressive group had 59% or less. Mothers were divided according to their emphasis on objects or persons. The cut-off criterion used was a ratio of object references to total references (objects and people) of 55%. Thirty-six dyads met these criteria and their distribution in the matrix design is presented in Figure 1.

		Child's Productive Vocabulary		
		> 14		< 8
		Common nouns		
		> 65%	< 59%	
Maternal Object Reference	≥ 55%	6	5	4
	< 55%	2	5	14

Figure 1. Distribution of subjects in matrix design.

The subsample of 12 children was composed of two subjects from each cell of the design, and the selection criteria were made more stringent to increase the likelihood that stylistic differences would be found. Early talkers were selected on the basis of productive vocabularies of 20 words or more. A minimum of 65% common nouns was the criterion for the first column, and a maximum of 45% common nouns was the criterion for inclusion in the second column of the design. Finding the last

child for the subsample proved more difficult than had been anticipated, and required screening of additional subjects.

Nine children from the overall sample had 13-month vocabularies of 8 to 14 words. Their data only appear in group comparisons based on the overall sample of 45 children. Most analyses are based on the 18 early talkers who fell into the first two columns of the design, since there are reliable estimates for both maternal and child measures at 13 months for those children only. A vocabulary of less than 15 words was not considered a reliable base for estimating stylistic tendencies. The 18 early talkers are compared with the 18 children in the group of late talkers, and some analyses are focused on the late talkers alone. Descriptive statistics for the overall sample of 45 dyads are reported whenever relevant. Qualitative analysis of individual children from the subsample are also presented.

The study was designed to test several hypotheses. If maternal referencing of objects is the single best predictor of individual differences in children's language style, subjects from cells in the top row of the matrix should develop a referential style of speech, and, at 20 months, appear more similar to each other than to those subjects in the bottom row, despite 13-month variation. In addition, maternal referencing behavior should remain stable over time, since other researchers have found that maternal referencing is matched to style at 20 months. However, if the referential-expressive distinction reflects biological or cognitive style differences, column differences might be expected. In this case, if the direction of control is from child to mother, maternal referencing should not remain stable over time for all

mothers, but should be adjusted to the child's emerging style. Alternatively, if the referential style is related to advanced language development rather than the composition of the early vocabulary, the first two columns might collapse into one, and the expressive children might be found in the third column. Finally, if stylistic differences are the result of an interaction between maternal behavior and the child's predisposition, it would be possible to reveal this interaction from the matrix design. Children in the top left cell would exhibit referential speech, while those in the middle cell on the lower row would be most expressive. Children in the two other cells in those columns might be more balanced in their style. Children in the third column on the top row might develop a referential style, but would probably not develop an expressive style, and vice versa for those in the lower row. A slightly different prediction would result if stylistic differences are viewed as the result of an interaction between maternal referencing and child precocity. For both interaction hypotheses it was expected that maternal referencing would remain stable over the time span of the study only for matched dyads.

CHAPTER II

METHOD

II.1 Subjects

Forty-five mothers and their 13-month-old children (mean age = 403 days; range = 394 - 412 days) participated in this study. The basic sample of 39 dyads was obtained by approaching private obstetric and pediatric groups in New York City, and mothers volunteered to participate with their infants. These dyads have also participated in a longitudinal study on the relationship between infant habituation measures and symbolic development at New York University from 5 months. The original pool was exhausted before enough mothers and children could be found to meet the criteria set for the subsample (see above). Additional children were solicited from Dr. Louise Hainline's subject files for an infant perceptual experiment at Brooklyn College, C.U.N.Y.. Mothers were interviewed by phone to determine whether their children might meet the criterion of producing 20 words at 13 months. An additional 6 children were added to the study before all cells of the matrix design for the subsample were filled. All infants were full-term with uneventful prenatal and perinatal histories, and free of any known neurological, sensory or physical abnormalities. The sample was composed of 24 females and 21 males. Thirty-six of the children were first-born and 9 were later-born. Mean age at the 20 month visit

was 619 days (range = 611 - 629). Based on Hollingshead's Index (1975), all children came from middle to upper socioeconomic status households (mean SES = 59.4). The sample was homogeneous, clustered towards the upper limit of Hollingshead's Index, with an SES range of 48 to 66 (s.d. = 5.5).

II.2 13-Month Home Observation

Procedure

At 13 months all 45 subjects were videotaped interacting with their mothers in their own homes in two contexts: a fifteen-minute free play session; and a fifteen-minute caretaking episode focused around a meal. For the free-play session a box of toys was provided in an attempt to minimize contextual variation. The toys were chosen on the basis of Wolf and Gardner's (1979) descriptions of dramatists' and patterners' play styles, and were intended to afford both styles of play. The set included a teaset, a toy telephone, a doll and blanket, a train, two picture books, a foam rubber ball, and a set of nesting barrels. The picture books contained simple representations of common objects (e.g. shoes), toys (e.g. a ball), and animals. Any words in the books had been obliterated to prevent mothers from simply reading to their children. For both videotape sequences the mother was asked to interact normally with her child, and not to attempt to elicit language.

The decision to observe mother-child dyads in their own homes in an attempt to obtain naturalistic data is susceptible to the criticism that mothers do not behave naturally in such circumstances (Graves & Glick, 1978). However, other methods,

such as diary studies, are liable to their own flaws, and would not have satisfied the requirements of this study, since the videotapes were analyzed mainly as a source of maternal language. Audiotapes could have been used and would have been less intrusive. However, the decision between audio and videotapes had to be based on a trade-off in terms of contextual information, which allows more accurate interpretation of the functions of maternal utterances and maternal referencing behavior. Moreover, even if maternal behavior is affected by the observer's presence, variations may still emerge. In the final analysis, no perfect methodology exists, and researchers must work within the limitations of the methodology they use and be sensitive to the problems that it causes.

In addition, mothers were administered a structured questionnaire (Snyder, Bates, and Bretherton, 1981) designed to establish the child's comprehension and production of language (Appendix A). Mothers were informed that no child at 13 months comprehends or produces all of the words in question, to prevent mothers from over-exaggerating their children's vocabularies out of anxiety. Mothers were also provided with concrete examples in which a child's apparent comprehension of a word may be attributed to other factors, such as tone of voice, accompanying gesture or contextual support. When it was clear that the mother understood these points, she was questioned extensively regarding each item, and systematically probed about the context in which any word was comprehended or produced. All interviews were recorded on an audio cassette tape recorder. Mothers were required to provide concrete examples in each case and to explain the nature of the child's response to

justify her claim for comprehension by the child. Where the mother's explanation was unclear, she was questioned further with specific questions designed to elucidate the extent of the child's comprehension.

Measures

The interview was scored for the most part following Snyder et al. (1981), to provide measures of the child's context-free and context-restricted comprehension and production (see Appendix B). Additional rules were generated to cover specific situations (see Appendix C). Each mother's report of her child's comprehension and production was broken down into context-free and context-restricted measures, and separate scores were obtained for the categories of common nouns, proper nouns, and non-nouns.[1]

In assessing the child's early vocabulary, no assumption was made as to whether or not the child had made a 'real' entry into the language system, or whether these first words would actually fulfill linguists' requirements regarding reference. To some extent, since the focus of the study is stylistic variation, it would be prejudging the situation and biasing the data to use stringent criteria regarding reference, since it appears that expressive children's early language may be imitative use of stereotypical phrases in appropriate situations. It is therefore possible that some of the 'words' included would not be accorded the full status of words by other researchers and might be considered to be merely 'indexicals' (Dore, 1981) or

[1]Snyder et al., have used the term 'predicates' to refer to all words or phrases comprehended or produced by the child which were neither common nouns nor proper nouns. However, because the term might be construed to imply more grammatical structure than is intended, 'non-nouns' is being used in the present study.

'prelexical forms' (Nelson & Lucariello, 1985). The criteria used for context-free comprehension or production were those of consistency and the ability to respond appropriately to absent references. Context-restricted comprehension was credited in situations where gesture, tone of voice or specific context played a role. The production of a word was considered context-restricted also if it was used only in relation to a particular exemplar of a class (e.g. 'ball' only for the child's own ball) or only during a routine game. Certain phrases included on the questionnaire were coded as single lexical items, unless there was independent evidence that the child understood the constituent words.

Maternal interviews were used as the primary source of data to establish each child's vocabulary, since the range of a child's vocabulary was unlikely to emerge during the videotaped 13-month sessions. Snyder et al. (1981) have claimed that mothers can be reliable observers when interviewers ask specific questions and mothers are required to provide examples. Also, Bretherton et al. (1983), have found that 20-month interview data were better predictors of language measures at 28 months than were observational data. In an experimental setting, Behrend (1988) has demonstrated that parents can be accurate predictors of their children's linguistic competence. Using a signal detection paradigm, it was found that 13-month-olds understood words which their parents predicted they would understand, from a group of common words (e.g. bear, dog), but showed no comprehension of those words their parents claimed they did not understand.

The 13-month videotaped sessions were used mainly to establish maternal

language measures, although observed child language measures were compared with reported measures in an attempt to assess the reliability of the questionnaire. Transcripts of the videotaped episodes include actions by both participants in addition to vocalizations. Maternal referencing behavior was coded adhering to the methodology outlined in Furrow and Nelson (1984), and clarified through personal communication with both authors. Each mother's use of nominals (nouns and pronouns) was divided into the major categories of nouns and pronouns, and the number and proportion of object references and person references were also calculated (see Table 1). All nominals were further subdivided into the categories of object-noun, object-pronoun, person-noun, person-pronoun, abstract-noun and abstract-pronoun, and proportions calculated for each category.

Table 1

Coding for Maternal Nominals

NOUNS: Includes concrete nouns (e.g cup, ball, dog, hand), proper nouns (e.g. Emily, Mommy, pet's name, nickname e.g. Pumpkin) and abstract nouns (e.g. a kiss, a bite, a mess).
PRONOUNS: Includes pronouns (e.g. I, you, me, she, we, us, they), possessive pronouns (e.g. your, my, her, our), demonstrative pronouns (e.g. that, this), interrogative pronouns (e.g. who, what), pro-forms (e.g. more, some, another, one) and prolocatives (e.g. here, there).
PERSON: Includes references to family pet (by name or person pronoun) and people in books and photos, as well as references to real people. Also includes 'person-alized' objects (e.g. mother refers to rag doll as "she" or gives it a proper name).
OBJECTS: Includes objects and animals in books (as well as reference to a pet as "the cat"), and body parts.

The total number of nominals exceeded the combined number of person and object references because of the existence of abstract nouns, and the use of pronouns to refer to events or actions. In addition, nominals occurring in songs and nursery rhymes were not coded as either object or person references.

In addition, the function of each of the mother's utterances was coded, using Hampson's (1988) modified version of Folger and Chapman's (1978) coding scheme, displayed in Table 2.

Table 2

Functional Coding Scheme for Maternal Utterances

1.DESCRIPTIONS: referring to observable or verifiable aspects of the environment.	
Includes:	
Identifications	e.g. That's a doll.
Events	e.g. I'm drinking my tea.
Properties	e.g. He has a big, long nose.
Location	e.g. The cup's over there.
2.REQUESTS FOR INFORMATION: open-ended questions, including specific requests for repetition or elaboration.	e.g. Who's that?; Huh?
3.PERFORMATIVES: Riddles, nursery rhymes, peekaboo routines, dramatic phone talk, songs, reading.	
4.ELICITED IMITATIONS: e.g. "Can you say ....."	
5.REFERENTIAL REPETITIONS: exact repetition (or including "yes") of child's noun or multiword utterance containing noun.	
6.CONVENTIONAL RECASTS: repeats child's utterance in a more conventional form.	

Table 2 (cont.)
Functional Coding Scheme for Maternal Utterances

7.STATEMENTS: express beliefs, attitudes or emotions.

Includes:	
Evaluations	e.g. Good; I like that.
Internal reports	e.g. I'm sleepy.
Attribution	e.g. You just like to pull those.
Rules	e.g. You can't touch that.
Intentions	e.g. I'll get you some water.

8.REQUESTS FOR PERMISSION: including specific requests for confirmation (Yes/no questions) and repetitions of child's utterance with question intonation.

e.g. Can I help you?
e.g. Do you want it?

9.REQUESTS FOR ACTION: elicits action from the child whether in the form of commands, questions or embedded commands.

e.g. Why don't you .....
e.g. Try that one; Look at this.
e.g. Let's play with this.

10.CONVERSATIONAL DEVICES: to establish or maintain contact.

Includes:	
Boundary markers:	e.g. Hi ; thank you
Calls:	e.g. John (when not commanding action)
Accompaniments:	e.g. There you go; Okay; Alright; Woops.
Utts. for child:	e.g. Mommy, you're crazy.

11.EXPRESSIVE REPETITIONS: exact repetition of non-noun utterance by child.

12.SOUNDS: meaningless noises.

e.g. Ah; Oh; Ahemm.

Because this is a functional coding scheme, the categories cut across grammatical distinctions. If the mother made a request for information, such as "What is this?", but immediately provided the answer herself in the form of another question, "Is it a truck?", her second utterance was coded as a description, overriding

its ostensible question form. For the purpose of this analysis, an utterance unit was defined as the smallest unit of speech which fulfilled one of the functions identified by the coding scheme. In most cases this demarcation was also characterized by a perceptible pause, and possibly by a transfer of turn-taking to the child. However, neither of these was required, and the definition permitted the segmentation of run-on speech by the mother, so that each utterance was assigned only one code. It was hypothesized that there might be an association between mothers' emphasis on the first six functional categories and referential child language, while the other categories might be more related to the expressive style.

Design

Thirty-six children were selected from the total group of 45 subjects, based on the size of the child's 13-month productive vocabulary. Children were selected for each of three categories: a) those with productive vocabularies of at least 15 words, composed of at least 65% common nouns; b) those with productive vocabularies of at least 15 words, but composed of 59% (or less) common nouns, and c) children whose productive vocabularies at 13 months contained 7 words or less. The third category was included to assess to what extent referential style reflects linguistic precocity.

Within each category, the children were distributed into the relevant cells of a 6-cell matrix design depending upon maternal referencing behavior. The free-play session was used to determine maternal referencing behavior because other researchers (Dellacorte, Benedict & Klein, 1983) have claimed that caretaking sessions are too structured to allow variability to emerge. The cut-off criterion for maternal

referencing behavior was an object/object-plus-person ration of 55%. Those who had mothers whose use of nominals (nouns and pronouns) at 13 months was predominantly to refer to objects (i.e. 55% or more) were assigned to the first row of the design, while those subjects with mothers who predominantly referred to people, or who were balanced in their referencing behavior, (i.e. under 55%) were assigned to the second row (see Figure 1). The mean object referencing ratio for row 1 was 63.40 (range = 55 to 77) and 47.95 for row 2 (range = 37 to 54). Overall, for all 36 subjects, the mean maternal referencing ratio was 54%.

II.3 Subsample

In addition a subsample of 12 subjects was selected from these 36 subjects, using more stringent criteria, in order to maximise the likelihood that extreme examples of referential and expressive styles might be located. Eight children were selected from the first two columns of the design. These children all had productive vocabularies of 20 words or more. The four children for the first column were selected on the basis of having 65% or more common nouns in their 13-month productive vocabularies, while the four in the second column had 45% or less. These twelve subjects were selected so that they could be evenly assigned to the relevant cells of a matrix design:

	Child's Productive Vocabulary		
	> 19 Words		< 8 Words
	65% nouns	45% nouns	
Maternal Reference: Objects	2	2	2
Maternal Reference: People	2	2	2

Figure 2. Distribution of subsample into matrix design.

Beyond ensuring that there was a minimum of two subjects for each cell of the design in order to fulfill the requirements of the subsample, no attempt was made to equalize cell sizes. It was considered that the distribution of subjects between cells would provide information in itself. When it proved impossible to fill one of the cells for the subsample from the initial pool of subjects, additional subjects were solicited, and all subjects assessed for inclusion (i.e. videotaped in order to determine maternal referencing) were added to the study until the second subject for that cell was found. As a result, it is hoped that the distribution of subjects within the first two columns of the design (i.e. the early talkers) reflects the population distribution, although it should be noted that many more children would have been included in the last column if all subjects contacted had been included. The present sample therefore was made 'top-heavy' in the process of finding the last subject for the subsample.

Each of the 12 subjects in the subsample was subsequently visited four times: at 15 months and 2 weeks, 16 months, 18 months and 20 months. At 15 months and 2 weeks, the mother-child dyad was observed during a normal morning's interaction. The purpose of this visit was to allow the experimenter to select another context of

interaction in which to videotape the dyad. Since Klein (1980) found that object-play was almost non-existent in the expressive dyads that she studied, it was anticipated that the requested free-play context might not be representative of normal interaction for all mothers. During this visit the observer took notes regarding the activities in which both the mother and child were engaged, their proximity to each other, and recorded any child language. Based on observations during this home visit an additional 15-minutes of interaction, typical for each dyad, was added to the free-play and feeding episodes for both the 16-month and 18-month videotape sessions. These 'idiosyncratic' episodes sometimes included other siblings and, depending on the dyad, included such activities as object-play with personal toys, book-reading, computer games or activity related to music.

To provide novelty, some toys were changed for the 16-month visit. While the ball, phone and doll remained the same, additional items were added to the teaset, and a different book was provided. The new book was the Brimax 'Hearing' book from their "Show Baby Plus" series. Pictures in the book represent children in familiar situations interacting with people and common objects and animals. All printed words in the book were obliterated once again. The 16-month toys also included a Child Guidance pot-shaped shape sorter with an oversized spoon, a Fisher-Price minibus containing four people and a dog, and a set of eight large cardboard blocks bearing pictures of animals. For the 18-month visit all toys were changed. The Nerf ball was replaced with a plastic Waffle ball, and the more elaborate Fisher-Price Chatter Phone replaced the one used for earlier visits. The remaining toys included a

set of pots, pans and utensils, a 12 piece set of Waffle blocks, a Little Tikes Dump Truck, a Fisher-Price stackable dog, and another Brimax book, 'Seeing', from the same series. Transcripts obtained from all three contexts at 16 and 18 months were analyzed to examine the development of the child's language style.

II.4 20-Month Home Observation

Procedure

All 45 subjects were videotaped again at 20 months in the same two contexts as those used for the 13-month visit. Toys used for the play session duplicated those used for the 16-month visit to the subsample.

Measures

Twenty months is the point at which stylistic differences in language use are most prominent (Nelson, 1973, 1981), and all subjects were characterized based on their vocabularies at this age. While the overall study is concerned with the influence of maternal language, it is important to distinguish between the long-term effects of the mother's speech to the child and constraints imposed by the mother as the discourse partner in the immediate situation. As a result, only spontaneous child language from the transcripts was used to determine the child's style, and responses to questions, or commands to repeat a particular word, were not counted. Children were characterized as referential or expressive depending on their 20-month noun-to-total-word ratio. A ratio of 60% or more was the criterion for the referential style, and 40% or less was the criterion for the expressive style. Maternal utterances were

again analyzed in terms of references and functions.

20-month transcripts from subjects in the subsample were also subjected to a functional analysis of child utterances. The analysis was based on Halliday's (1975) description of mathetic and pragmatic functions, which has been modified and used by Furrow (1980), Lucariello (in preparation) and Hampson (1988). The categories are described in Appendix D. 20-month child language was subjected to a functional analysis in an attempt to characterize individual children's use of language to supplement the form analysis provided by the noun-to-total-word ratio.

In addition to assessing stylistic differences based on the 20-month transcripts, Mean Length of Utterance (MLU) and Maximum Length of Utterance (MaxLU) were calculated from the 13-month and 20-month data for each child (see Appendix E). 20-month MLU was used as an index of grammatical development. The total sample of 45 children was divided according to 20-month child's style. Separate correlations between 13-month maternal language measures and 20-month grammatical development for each group were calculated in order to assess the differential effects of maternal 13-month language measures.

While some analyses focus on individual profiles of children from the subsample in an attempt to document each child's developing language, the bulk of the analyses are focused on maternal and child language measures at 13 and 20 months for the thirty-six children who were distributed into the 6 cells of the matrix design. Eighteen of those 36 children fell into the first two columns of the matrix (i.e. productive vocabularies of 15 words or more), and they are referred to as the group of

early talkers in subsequent analyses. The group of late talkers is also composed of 18 children, who had 13-month productive vocabularies of 7 words or less. The majority of the analyses are based on the group of 18 early talkers, since that is the only group for which there are reliable 13-month measures of the child's stylistic tendencies. It is assumed that if the vocabulary size is 15 words or more, the proportion of common nouns in the child's vocabulary may reflect a significant difference between children. However, if the child produces only 3 words, a 66% emphasis on common nouns may mean very little, since the addition of just two more non-noun words would totally shift the child's emphasis.

In addition, 9 children produced between 8 and 14 words at 13 months. Their data are included in some analyses, but because their styles could be assessed less reliably at 13 months they were not included in the evaluation of mother-child interaction influences.

CHAPTER III

RESULTS

The results of this longitudinal study will be presented in several different ways. Some analyses are based on the entire sample of 45 mother-child dyads. However, a significant focus of the study is the group of 18 early talkers, and many analyses are based exclusively on that group. Contrasting results will also be presented for the 18 late talkers. Results are presented chronologically, starting with descriptive statistics and concurrent correlations among the 13-month variables. These are followed by lagged correlations between 13 and 20-month variables. Finally, this section includes a qualitative analyses of language development across the seven-month study period for selected children.

The results are based on a sample of 45 mother-child dyads. Six children from the original longitudinal study of 45 children are not included. Two families moved out of state and did not participate. A third mother failed to take part in the 20-month visit because of serious illness, and two children being raised bi-lingually were excluded from the analyses. A sixth child was excluded on the basis of maternal non-cooperation with experimental instructions. Six additional children were added to the subject pool at 13-months in order to meet the requirements of the design of the study.

III.1 Demographics

All subjects came from middle to upper socioeconomic status households. The mean SES rating for the sample, based on Hollingshead's Index (1975), was 59.4 (range 48 to 66, s.d. 5.5). The average level of education for both mothers and fathers was beyond college graduation (means of 6.5 and 6.7 for mothers and fathers respectively).

No relationships were found between SES and maternal referencing measures or child language measures at 20 months. However, significant negative relationships were found between SES and some child language measures at 13 months and some maternal 13-month functions of language. Specifically, negative correlations of .38 were found between SES and the size of the child's 13-month productive vocabulary, the number of common nouns and the number of proper nouns in that vocabulary, based on the maternal questionnaire. Similarly, maternal use of repetitions of nouns (both number and percent) was negatively related to SES (r = -.49, -.43, respectively). These results, however, can be explained in terms of the different sources of the subjects. The original group of children represented an unusually high socioeconomic sample (mean SES = 60.0, range 51 to 66). While the additional six children were also from upper-middle-class to upper-class backgrounds, their mean SES was slightly lower (55.8, range 48 to 66). Since these children were all chosen specifically because they were early talkers with large vocabularies, their inclusion has resulted in a negative correlation between SES and vocabulary size. The negative

correlation between maternal repetition of nouns and SES can be similarly explained, since the child has to produce such nouns in order for the mother to repeat them, and indeed early talkers receive a significantly larger number of these repetitions than children with smaller vocabularies (t (43) = 4.47, $p < .0005$). Moreover, given the relative homogeneity amongst the total sample in terms of SES, (which has a potential range of scores from 8 to 66), it probably makes little sense to talk about SES effects based on this sample.

Since the Hollingshead calculation of SES is partially based on maternal and paternal education levels, it is not surprising to find a similar pattern of negative correlations between those two variables and measures of advanced language for both children and mothers. These counter-intuitive findings are also explained by the bias introduced into the sample by the addition of six extremely advanced children of a slightly lower SES from the original group.

The sample was composed of 24 females and 21 males. Child gender was not significantly associated with any of the child language measures at 13 or 20 months, nor was there any association of gender to maternal 13 and 20-month variables. Since the majority of the children in the sample were first-born, relations between parity and child or maternal variables should be interpreted with skepticism. Six children were second-born, two third-born and one fourth-born. Parity was not significantly related to any of the child language measures at either age. However, parity was associated with differential maternal use of references and language functions at 13 months: mothers of first-borns provided more descriptions, more nouns and more

object nouns than other mothers (r = .33, .31, and .29 respectively, $p < .05$).

An examination of the relevant plots reveals that mothers of first-borns are distributed evenly across the range of values for each variable, while mothers of later-born children cluster in the lower half of the range. For example, at 13-months the range for maternal descriptions during the play session is 3 to 116. No mother of a later-born child provides more than 51 descriptions, while 21 of the first-born children have mothers who do so.

Maternal work status was assessed when the infants were 2 months old and 10 months old. Initially thirty-two mothers did not work outside of the home. Five mothers worked part-time and eight worked full-time. By the time the infants were 10 months old only 22 mothers were still full-time homemakers. Eight mothers worked part-time and 15 mothers had returned to full-time employment. Maternal work status at 2 months was not related to any child or maternal variables. Ten-month maternal work status was unrelated to productive child language at 13 or 20 months. However, maternal work status at 10 months was negatively related to percent of child comprehension composed of common nouns (r = -.33, p = .029). Working mothers had children whose comprehension emphasized non-nouns and proper nouns more than common nouns. Maternal work status at 10 months was also negatively related to maternal use of descriptions (r = -.34, p = .021) and positively related to maternal use of abstract nouns and pronouns (r = .38, p = .009).

Since it was felt that a non-working mother of a first-born child might be able to allocate more time to her child than either a working mother or a mother

with several children, a demographic variable was computed in an attempt to assess the impact of the amount of time a mother might be able to spend with her child. Maternal work status at 10 months (coded 0 for homemaker, 1 for part-time work, and 2 for full-time work) was combined with parity of the child, to produce a computed variable. While there was no relationship between this variable and child language measures at 20 months, it was related to the size and composition of the child's vocabulary at 13 months, as assessed by the maternal questionnaire. First-born children with mothers who did not work had larger vocabularies, containing a higher percentage of common nouns. First-born children with working mothers, and later-born children with either working or non-working mothers, tended to have smaller vocabularies containing a lower percentage of common nouns. The correlation between size of vocabulary and the computed variable was -.35 (p = .017). Percentage of common nouns in the child's 13-month vocabulary correlated -.39 (p = .008) with this computed variable.

III.2 Child Language Measures at 13 months

Descriptive statistics for 13-month language comprehension and production as reported by maternal questionnaire are presented in Table 3.

Table 3.

Descriptive Statistics of 13-month Language Measures

	Mean	S.D.	Range
Language Comprehension			
Total comprehension	63.9	24.4	23-118
# common nouns	27.7	17.3	4-69
Percent common nouns	39.8	11.6	17-63
Percent non-nouns	48.9	9.7	29-70
Percent proper nouns	11.3	4.6	4-28
Percent flexible	69.8	15.5	42-99
Language Production			
Total production	18.5	19.6	0-79
# common nouns	9.9	13.2	0-54
Percent common nouns	40.6	22.9	0-73
Percent non-nouns	34.4	20.1	0-100
Percent proper nouns	22.8	18.5	0-80
Percent flexible	58.1	27.9	0-100

(N=45)

From Table 3 it is clear that within both comprehension and production the sample provided a range of variation consistent with stylistic differences. The percentage of common nouns comprehended varied from 17 to 63 percent. In production the range was even larger: from 0 to 73 percent.

There are some similarities between these results and those found by Bates et al. using the same questionnaire with a sample of 32 children. Bates et al. report that within comprehension the mean percentage of common nouns was 34, with a range of 14 to 66 percent. Mean total comprehension for the Bates et al. sample was 48.3, with a range of 17-97 words comprehended. In production, the percentage of common nouns averaged 27.6, with a range of 0 to 77.8 percent. Mean total production for the Bates et al. sample was 12 words, with a range of 0 to 45 words. The current sample includes children who are more advanced than those in Bates et al.'s sample, particularly in language production.

Table 4 displays the Pearson correlation coefficients among the 13-month child language variables as assessed by the maternal questionnaire. All significant correlations here and reported subsequently have been examined with bivariate scatterplots to determine whether assumptions of linearity were violated. Within both comprehension and production the percentage of the child's vocabulary that is flexible is related positively to the percentage of common nouns (r = .72 and .49) and negatively to the percentage of non-nouns (r = -.76 and -.47). Similarly, the total size of vocabulary is positively related to the percentage of common nouns within both productive and receptive vocabulary (r = .53 and .78, respectively). This result is highly consistent with Bates et al.'s (1988) finding that percentage of common nouns correlates with vocabulary size both within production (r = .51) and comprehension (r = .77). Children with larger vocabularies, therefore, tend to have vocabularies containing a higher percentage of common nouns and their vocabularies are mainly

flexible. Moreover, size and flexibility of productive vocabulary are also positively related to percentage of common nouns comprehended (r = .68 and .43, respectively). However, it should be noted that while there is a significant relationship between the percentage of common nouns produced and the size of the child's productive vocabulary it accounts for only 27 percent of the variance. Moreover, there is no significant negative relation between percent of non-nouns produced and size of productive vocabulary. Some children, therefore, have large vocabularies without emphasizing nouns.

Table 4

Concurrent Correlations among 13-month Language Variables.

	Comprehension Percent			Production Percent			
	Non-noun	Flex	Total	Noun	Non-noun	Flex	Total
Comprehension							
% Noun	-.92**	.72**	.78**	.59**	-.36*	.43*	.68**
% Non-noun	-	-.76**	-.77**	-.60**	.40*	-.50**	-.62**
% Flex		-	.80**	.33*	-.19	.62**	.51**
Total			-	.46*	-.31*	.61**	.54**
Production							
% Noun				-	-.51**	.49*	.53**
% Non-noun					-	-.47*	-.14
% Flex						-	.35*

*$p < .05$
**$p < .0005$
(N = 45)

It is also clear from Table 4 that children are consistent in stylistic variation from comprehension to production. Percent of common nouns comprehended is

positively related to percent of common nouns produced (r = .59) and negatively related to percent of non-nouns produced (r = -.36). Similarly, percent of non-nouns comprehended is positively related to percent of non-nouns produced (r = .40) and negatively related to percent of common nouns produced (r = -.60). The results of the present study differ from those reported by Bates et al. (1988) in finding consistency across modalities in size of vocabulary and style. Table 5 displays differences and similarities between the two sets of results.

Table 5

Comparison of Bates et al. and Hampson
Questionnaire Results

Bates et al.

	Production			Comprehension
	Total	% Nouns	% Flex Nouns	Total
Production				
% Nouns	.51**	-		
% Flex Nouns	.50**	.84**	-	
Comprehension				
Total	.27	.42*	.56**	-
% Nouns	.27	.37	.62**	.77**

*p < .05; ** p < .01; (N=32)

Hampson

	Production			Comprehension
	Total	% Nouns	% Flex Nouns	Total
Production				
% Nouns	.53**	-		
% Flex Nouns	.55**	.81**	-	
Comprehension				
Total	.54**	.46*	.62**	-
% Nouns	.68**	.59**	.66**	.78**

* p = .002; ** p < .0005; (N=45)

Bates et al. found non-significant relations between total comprehension and total production, measures which are significantly related in the present study. Similarly, Bates et al. found that total production and the percentage of nouns produced were not significantly associated with the percentage of nouns comprehended. In the present study, both measures are significantly related to the percentage of nouns comprehended. Children who are producing many words at 13-months tend to also comprehend many words, and tend to emphasize common nouns in both modalities. While the association between percentage of nouns and size of vocabulary is significant for both modalities, it accounts for more than 60% of the variance in size of receptive vocabulary compared with only 27% of the variance in productive vocabulary size.

The greater consistency in the present sample can probably be explained by the fact that the group as a whole are more advanced than those studied by Bates et al. Only 13 of Bates et al's 32 subjects had receptive vocabularies of over 50 words, compared with 30 of the current sample (66%). Bates et al. report that none of their children has crossed the 50 word boundary in production, while 5 subjects from this sample have reported vocabularies larger than 50 words. It is to be expected that as children's vocabularies increase in size, percentage measures will be more reliable indicators of stylistic preference. For example, a score of 100% common nouns with a vocabulary size of 20 words is more likely to indicate a real noun emphasis, than a similar score when the vocabulary size is only one. The current sample, however, also contains children who have small vocabularies. Eighteen subjects have productive

vocabularies of less than 7 words at 13 months. Another 18 children have vocabularies of 15 words or more. This large range within the sample may also partially explain the differences between the two sets of results.

Correlations between language measures as reported on the maternal questionnaire and the 13-month play transcript are summarized in Table 6. As might be expected, the observed language production was much lower than reported production. Average observed production was 6.7 words (range 0 to 37). Only four children produced no recognizable words, however, and the child who had been estimated to have the largest vocabulary by his mother (79 words) did indeed produce the most words under observation (37 words). Size of productive vocabulary reported on the questionnaire is positively associated with observed MLU and MaxLU ($r = .53$ and .58 respectively, $p < .0005$).

Table 6.

Correlations between 13-month Observed and Reported Child Language.

	Observation		
	# Nouns	# Non-nouns	% Nouns
Questionnaire Production			
# Common nouns	.73**	.51**	.45*
# Non-nouns	.57**	.69**	.22
% Common nouns	.42*	.09	.47*
% Flexible	.33*	.18	.26
Total Production	.74**	.62**	.40*

* $p < .030$
** $p < .0005$
(N=45)

The comparison between observed language production and maternal reported language indicates that maternal reports can be reasonably reliable, and provides a validation for the reliability of the questionnaire. Given that 18 of the children had productive vocabularies of less than 7 words according to the maternal report, both reported and observed measures for those children are likely to be poor estimates. The associations reported in Table 6 are not large, but it is surprising that significant associations could be found. Maternal estimates of the size of the child's productive vocabulary were significantly related to both the number of nouns and the number of non-nouns produced under observation ($r = .74$ and .62, respectively, $p < .0005$). The percent of common nouns in the child's vocabulary according to the mother's estimate correlated significantly with the percent of common nouns observed ($r = .47$, $p = .001$). For both nouns and non-nouns, the number reported by the mother was significantly related to the number actually used during observation.

While both the number of observed nouns and the number of non-nouns correlate with vocabulary size reported on the questionnaire, the number of nouns is a better predictor of vocabulary size, and there is a positive relationship between the percent of nouns observed and reported vocabulary size. Noun emphasis, therefore, is consistently associated with advanced productive language, regardless of whether maternal reports or observations are used. Similarly, reported flexibility of productive language is related to the number of nouns produced during observation. Stylistic consistency is also revealed: there is a significant positive relationship between the percent of common nouns observed and the percent of common nouns reported by the

mother.

Despite the overall relationship between noun production and vocabulary size, it would be a mistake to assume that all of the early talkers are noun producers. In fact, for the group of eighteen children with vocabularies of 15 or more words at 13 months, there is no relationship between noun emphasis (measured by percent of common nouns produced during observation) and either flexibility or size of vocabulary, as Table 7 shows. This is the first evidence that there is stylistic variation within this group of 18 children. It is reinforced by the fact that for this group correlations between observed and reported noun and non-noun usage are consistent and discriminate between the two styles. Reported number of nouns produced correlates only with observed number of nouns produced ($r = .61$, $p = .007$), and reported non-noun usage correlates only with observed non-noun usage ($r = .62$, $p = .006$). There is also a signifant relationship between percent of common nouns reported and percent observed ($r = .65$, $p = .003$). It would appear that the group of early talkers includes children with distinct stylistic preferences.

It should be noted that Table 7 indicates stylistic differences between the children in the early talkers' group, while Table 6 shows that there are significant positive relations between the number of nouns observed and both the number of nouns and the number of non-nouns in the child's vocabulary according to the mother's report. Similarly, there are significant relations between the number of non-nouns observed and both the number of non-nouns reported and the number of nouns reported by the mother. These associations seem to imply that children using more

nouns tend to also use more non-nouns and vice versa. These results appear inconsistent with the findings of stylistic differences for the group of early talkers, displayed in Table 7, until the data are examined more closely.

Table 7.

Correlations between 13-month Observed and Reported Child Language for the Early Talkers

	Observation		
	# Nouns	# Non-nouns	% Nouns
Questionnaire Production			
# Common nouns	.61**	.29	.30
# Non-nouns	.33	.62**	-.27
% Common nouns	.36	-.21	.65**
% Flexible	.41	-.06	.35
Total Production	.63**	.47*	.14

* $p = .050$
** $p < .007$
(N=18)

From the overall group of 45 children, 22 children at 13-months were observed to produce less than 4 common nouns. Fifteen of those same 22 children also produced less than 4 non-nouns. Mothers had estimated that 17 of the same group of children would produce less than 4 common nouns, and that 16 of them would also produce less than 4 non-nouns. This core group of late talkers, producing neither common nouns nor non-nouns, has too little variation within it. The relationships found in Table 6, for the total sample of 45 children, are explained by the consistencies within this group, despite the fact that within the group of early talkers

there are clear stylistic differences.

Within the early talkers' group, only 3 children were observed to use less than 4 common nouns at 13 months. Three different children from the same group used less than 4 non-nouns. None of the children had been estimated by their mother to have less than 5 common nouns or 3 non-nouns in their 13-month vocabulary, and those who had been estimated to be low producers of common nouns had been estimated to have a large number of non-nouns in their vocabulary and vice versa. In sum, most early talkers who were displaying a stylistic preference were also producing significantly more of their non-preferred type of words than children from the group of late talkers. Those who produced few of one type, produced many of the other. When the analysis is based only on the early talkers, the range is truncated, and clear stylistic differences emerge.

Observed child language measures are reported in order to validate the use of the maternal questionnaire as an estimate of child language. However, in all subsequent analyses the questionnaire is used as the basis for child language measures at 13 months, since it is assumed to be more reliable than observations at that age.

III.3 Maternal Language Measures at 13 months

At 13 months mother-child dyads were videotaped in two different contexts: free-play and eating. Maternal language from each transcript was subjected to an analysis of referencing behavior and a functional analysis. Since the design of the

study is based on maternal referencing behavior during the free-play session, descriptive statistics for that analysis will be presented first, including the distribution of the entire sample into the designated matrix design.

Table 8.

Descriptive Statistics for Maternal References
(13-month play)

	Number			Percent		
	Mean	S.D.	Range	Mean	S.D.	Range
Utterances	276.76	78.76	134-458			
Nominals	328.07	110.00	102-665			
Noun	124.98	49.96	35-272	38.13	7.45	24-57
Pronoun	203.09	73.28	67-393			
Object	148.67	56.47	34-298	45.04	8.61	30-72
Person	117.56	46.87	46-250	35.91	7.16	21-52
Object noun	83.38	37.65	22-184	25.49	8.04	10-52
Person pronoun	86.87	36.12	38-193	26.53	5.74	11-37
Object pronoun	65.29	29.44	12-133	19.53	5.12	10-32
Person noun	30.69	17.07	2-77	9.38	4.31	1-21
Abstract noun	10.93	7.72	0-33	3.31	1.93	0-8
Abstract pronoun	50.60	20.83	15-99	15.76	4.85	6-29

($N = 45$)

Table 8 shows that on the average in the play session mothers produce about 18 utterances per minute, each one containing one nominal. Pronouns outnumber nouns by approximately 2 to 1, but references to objects and persons are roughly equal. However, a glance at the reported ranges for these variables reveals that such group statistics obscure variation between mothers. Mothers may produce as few as 9

or as many as 30 utterances per minute, and some mothers produced twice as many nominals per utterance as others (range = .75 to 1.50). Mothers also varied considerably in the extent to which they emphasized nouns, objects and persons in their references.

Thirty-six of the 45 children have productive vocabularies which match the selection criteria of either a minimum of 15 words or a maximum of 7 words. Fifteen of these children have mothers who emphasize objects more than people, while 21 have person-referencing mothers. Figure 3 shows the distribution of subjects when the sample is divided according to the 6-cell matrix design.

		Child's productive vocabulary		
		> 14 words		< 8 words
		Common Nouns		
		>65%	<59%	
Maternal Object Reference	> 55%	6	5	4
	< 55%	2	5	14

Figure 3. Distribution of subjects in matrix design.

Chi-square analyses of this distribution indicate that at 13 months a relationship exists between maternal referencing behavior and child vocabulary. The 3 * 2 $\chi^2 = 6.76$ ($df = 2$, $p < .05$). However, this relationship is explained when the first two columns are collapsed to test the association between vocabulary size and

maternal referencing. The 2 * 2 $\chi^2 = 5.6$ ($df = 1$, $p < .02$). The chi-square reveals a relationship between maternal referencing and the size of the child's vocabulary: mothers who refer to objects are more likely to have children whose language production is advanced (phi coefficient =.39). There is no significant relationship between maternal referencing and the child's style (χ^2 ($df = 1$) = 1.17, n.s.), when the analysis focuses on the first two columns only. However, it should be noted that 75% of the noun-emphasizing children with large vocabularies have object-referencing mothers. Moreover, it was extremely difficult to find noun-emphasizing children with person-referencing mothers. After exhausting the initial sample pool, it was necessary to screen approximately 100 children before the second child could be found to complete that cell of the design.

III.4 Concurrent 13-month Relations

It is important to determine whether or not the child's earliest stylistic tendencies are related to concurrent maternal variables at the beginning of the study. The percent of common nouns in the child's productive vocabulary as reported on the 13-month questionnaire, is the variable being used to identify stylistic differences amongst the children. However, since the total sample includes children with very small vocabularies, the percent of common nouns cannot be considered a reliable measure of stylistic differences for the whole sample.

Table 9 presents the concurrent maternal referencing and child language relations for the total sample of 45 subjects. Consistent with the chi-square results,

there is a significant relationship between maternal object referencing and vocabulary size. The size of the child's productive vocabulary is also significantly and positively related to maternal noun usage (rs = .33 and .32 with number and percent, respectively), object noun usage (rs = .42 and .41 with number and percent, respectively) and negatively related to percent abstract noun and pronoun usage (r = -.46). The reported percent of common nouns in the child's productive vocabulary also correlates significantly with the same maternal variables. In addition, there is a significant negative correlation between percent of common nouns in the child's productive vocabulary and maternal percent of person pronouns (r = -.36).

Table 9

Concurrent Correlations between Maternal References during Play session and 13-month Child Language (N=45)

	Child language	
	Vocab. size	% Common nouns
Maternal		
# Nouns	.33*	.34*
% Nouns	.32*	.46**
# Objects	.37*	.28
% Objects	.43**	.43**
# Obj. noun	.42**	.41*
% Obj. noun	.41*	.49**
% Pers. pron	-.19	-.36*
% Abstract	-.46**	-.31*

* p < .050
**p < .005

However, the percent of common nouns in the child's 13-month vocabulary

cannot be considered a reliable measure of stylistic tendencies for children with small vocabularies. Major analyses, therefore, will focus on the group of 18 early talkers, with vocabularies of 15 words or more at 13 months. For this group it is expected that a noun or non-noun emphasis is a reliable indicator of an early referential or expressive stylistic tendency on the part of the child. It is important to determine whether or not this tendency is already associated with maternal language variables at the onset of the study. Table 10, therefore, presents the relations between productive child language measures as reported by maternal questionnaire and maternal 13-month referencing behavior of mothers for the group of 18 children who were early talkers.

Table 10

Concurrent Correlations between Maternal References during Play session and 13-month Child Language for the Early Talkers (N = 18)

	Child Language	
	Vocab. size	% Common nouns
Maternal		
# Nominals	.61*	.20
# Nouns	.58*	.35
# Pronouns	.51*	.04
# Objects	.73**	.29
# Object nouns	.60*	.39
# Object pron.	.63**	.06
# Utterances	.56*	.19
% Person pron.	.13	-.52*

* $p < .050$
** $p < .005$

For the early talkers, vocabulary size is positively related to the number of

utterances and the number of nominals, (including both the number of nouns and the number of pronouns), used by the mother. Children with the largest vocabularies, therefore, have mothers who talk more, using many nouns and pronouns. The single best predictor of vocabulary size for this group is the number of maternal object references ($r = .73$, $p = .001$). Both noun and pronoun object references are significantly related to vocabulary size. However, none of the above measures are significantly related to the percent of common nouns in the child's 13-month vocabulary, which is the measure being used to assess stylistic preference. The only maternal variable which correlates with child's percent of common nouns is percent of person pronoun references and the relation is negative. However, this relationship appears to be an artifact of the uneven number of subjects in the two cells in the first column of the design. While the 10 subjects in the second column are evenly divided between the two rows, the 6 noun-emphasizing children with object referencing mothers in the first column have a much greater influence than the 2 children with person-referencing mothers. Since, on the average, approximately 75% of all person references are pronoun references, the negative relationship appears between person pronouns and child's percent of common nouns. It therefore appears that at the beginning of the study, at just 13 months, the children who have broken into language early are exhibiting stylistic tendencies which are unrelated to maternal referencing behavior.

However, the possibility still exists that there is some relationship between maternal language and children's initial stylistic preference. For this reason a separate

functional analysis of maternal language was performed. Table 11 presents descriptive statistics for maternal language functions at 13 months during the play session for the total sample of 45 dyads. It is clear that there is tremendous variation between mothers in terms of the functions of their utterances. For example, only 2% of one mother's utterances were descriptions, compared with 37% for another mother. While most mothers provided some performative play consisting of nursery rhymes, peek-a-boo routines, riddles and phone talk, for one mother this comprised 21% of her total utterances. Similarly, conversational devices, which are simply a means of maintaining or establishing contact, provided 30% of another mother's utterances. On the average, descriptions and requests for action are the two major functions, totalling approximately 40% of all utterances. However with such variation within the sample mean measures have very little significance. It should also be remembered that the most talkative mother, (in terms of the number of utterances), provided more than three times as many utterances as the least talkative mother.

Table 11

Descriptive Statistics for Maternal Language Functions
(13-month play)

	Number			Percent		
	Mean	S.D.	Range	Mean	S.D.	Range
Descriptions	58	25	3-116	21	7	2-37
Requests for information	21	12	0-57	7	4	0-16
Performatives	13	10	0-41	5	4	0-21
Referential repetitions	3	5	0-25	1	2	0-7
Combined ref. functions				22	8	2-44
Statements	30	22	8-136	10	5	5-32
Requests for permission	27	12	11-54	10	4	4-19
Requests for action	57	28	14-155	20	7	8-35
Conversational devices	35	16	11-90	13	5	3-30
Expressive repetitions	4	4	0-17	2	1	0-6
Sounds	25	14	4-67	9	5	3-22

(N=45)

Table 12 presents the concurrent correlations between selected maternal functions and the size and style of the child's vocabulary at 13 months for those children who were early talkers with vocabularies of at least 15 words. Most relationships are between vocabulary size and maternal function. Children with the largest vocabularies have mothers who provide more statements and repeat their children's nouns. Both of these functions can be interpreted as responses to the child's language. In the case of repetitions, the child has to produce the noun initially in order for the mother to repeat it. Similarly, many statements occur as evaluations after the child has correctly named something. It should be noted that the relationship exists only for referential repetitions, and that repetition of expressive child utterances is unrelated to vocabulary size. Also the relationship between vocabulary size and

number of maternal statements for the total sample is not significant (r = .05). However, the relationship between referential repetitions and vocabulary size does hold up for the total sample (rs = .78 and .74, for number and percent, respectively). This is not surprising, since the children with the smallest vocabularies are unlikely to provide their mothers with many occasions for repeating their noun productions.

Table 12

Concurrent Correlations between selected Maternal Language Functions during Play session and 13-month Child Language for the Early Talkers (N=18)

	Child language	
	Vocab. size	% Common nouns
Maternal		
# Referential repetitions	.70**	.35
% Referential repetitions	.60*	.39
# Statements	.67**	.12
# Requests for action	.47*	.09
# Conversational devices	-.25	-.50*
% Conversational devices	-.47*	-.58*

* $p < .050$
** $p < .005$

The number of maternal requests for action is also positively related to vocabulary size. This is a rather unexpected finding, since most studies (Nelson, 1973; Newport et al., 1977) have found a negative relationship between the use of commands or directives and the rate of progress in acquiring language. Moreover, requests for action are not significantly related to vocabulary size for the total sample of 45 children (r = -.13). It is possible that the relationship between requests for action and vocabulary size for this group is a spurious relationship based on

examining a truncated range. It should be remembered that within the group of early talkers, children with larger vocabularies have mothers who talk more. It is therefore likely that those maternal measures that correlate with vocabulary size in number only are bi-products of this overall relationship.

The child's initial stylistic preference is related only to the number and percent of maternal conversational devices, and the relationship is negative in both cases. The same pattern of relationships holds with the child's comprehension. Mothers who use empty conversational devices, such as "Okay" or "There you go", have children who both produce and comprehend more non-nouns than common nouns, and also produce and comprehend more non-nouns than other children (rs = .58 and .55, respectively). This is perhaps to be expected since the category of non-nouns from the questionnaire includes social routines. The percent of conversational devices in the mother's language is also negatively related to the size of the child's vocabulary for this group, and that relationship holds even for the total sample (r = -.34, p = .024).

Finally, maternal references and functions have been correlated with the child's style as evidenced from the 13-month play transcripts for the group of early talkers. No significant relationships were found between the child's spontaneous percent of common nouns (as an index of stylistic preference) and any of the maternal references or functions. However, the number of observed nouns did correlate highly and significantly with both the number and percent of maternal referential repetitions (rs = .90 and .84, respectively, $p < .0005$). Children in the

early talkers' group provided from 1 to 47 nouns, and mothers repeated on 0 to 25 occasions. Within this group, those children who produce more nouns are frequently having their nouns repeated to them. Maternal referential repetitions are also significantly related to child imitations. The number of child imitations of maternal utterances correlates both with the number and percent of maternal referential repetitions (rs = .63 and .52, respectively; $p < .026$). It cannot be determined from the data whether mothers imitate children who spontaneously imitate, or whether maternal repetitions encourage children to imitate.

III.5 Comparison of Early and Late Talkers

Before proceeding to examine the relationships between 13-month child and maternal variables to 20-month child outcome measures, it is of interest to examine the differences in maternal language between mothers of early and late talkers at 13 months. Both groups contain 18 subjects. All t-tests reported are two-tailed tests based on pooled variance estimates unless otherwise noted. Mothers of linguistically advanced children provided a higher percent of descriptions and referential repetitions than mothers of the late talkers. The mean percent of descriptions for the group of early talkers was 24 compared with a mean percent of 17 for the late talkers (t (34) = 3.13, p = .004). Early talkers had mothers who provided 6.4 referential repetitions on the average, compared with .3 for their slower counterparts (t (17.37) = 3.48, p = .003, using separate variance estimate). Similarly, mean percent of referential

repetitions is 2.3% for the group of early talkers compared with .2% for the late talkers (t (17.91)= 3.77, p = .001, separate variance estimate). The total percent of referential functions represented 41% of maternal language for early talkers but only 30% for the children with smaller vocabularies (t (34) =4.70, $p < .0005$). In contrast, mothers of the late talkers provided more requests for action, more conversational devices and a higher percent of requests for action than mothers of the early talkers. The relation between requests for action and slower language acquisition is consistent with other studies as mentioned previously. Mean number of requests for action for the group of early talkers is 42 compared with 60 for the late group (t (34) = -2.30, p = .028). Mean number of conversational devices for the group of early talkers is 29 compared with 40 for their slower counterparts (t (34) = -2.04, p = .049). Twenty-two percent of all maternal functions for the group of late talkers are requests for action compared with an average of 17 percent for the children who were early talkers (t (34) = 2.43, p = .020). Since the whole group of early talkers is ahead on these measures it implies that these functions are related to speed of acquisition but not to acquisition style.

There are also significant differences between the two groups of mothers in terms of their referencing behavior at 13 months. The early talkers are exposed to a significantly higher percent of nouns, object references and object nouns than the late talkers. Mean percent of nouns in total maternal nominals for the 18 advanced children is 41% compared with 35% for the group of late talkers (t (34) = 2.54, p = .016). Mean percent of object nouns is 30% for early talkers compared with 21% for

late talkers (t (34) = 3.69, p = .001). Mean percent of total references that are object references is 49% for the advanced group compared with a mean of 40% for the late talkers (t (34) = 3.25, p = .003). It should be remembered that the group of early talkers includes both children with object-referencing mothers and those with person-referencing mothers (range of percent object references = 34% to 72%). In addition, the late talkers are exposed to a higher percent of abstract nouns and pronouns: mean percent abstract nouns and pronouns for early talkers is 17% compared with 21% for late talkers (t (34) = -2.64, p = .012). These findings are consistent with the patterns of correlations between maternal referencing and size of productive vocabulary presented in Table 9.

When the children's own comprehension is examined further differences are found between the two groups. The group of early talkers obviously differ from the children who are late talkers in terms of their productive vocabularies, but there are also differences in comprehension. The children who have large productive vocabularies also comprehend significantly more words (mean = 77, compared to mean = 56 for the late talkers), and more of their comprehension is flexible. However, more importantly, their comprehension is composed of a higher percent of common nouns: mean percent of common nouns is 49% compared with 35% for the children who are late talkers (t (34) = 4.71, $p < .0005$). This is despite the fact that the early talkers' group contains children with a distinct preference for non-nouns in their productive vocabularies. The children in the late talkers' group have significantly higher percentages of proper nouns and non-nouns in their receptive vocabularies.

Mean percent of non-nouns is 52% for these children, compared with 42% for the early talkers (t (34) = 3.70, p = .001). Mean percent of proper nouns is 12% for the late talkers and 9% for the early talkers (t (34) = 3.25, p = .003). This difference can be explained by examining the mean number of common nouns for the two groups. While there are no significant differences in the mean number of non-nouns or proper nouns comprehended, children in the group of early talkers comprehend significantly more common nouns than children in the late talkers' group. Mean number of common nouns comprehended by the early talkers is 39, compared with 21 for the late talkers (t (34) = 3.43, p = .002).

III.6 Summary of 13-month data

To summarize the results so far, it seems that there is a relationship between maternal referencing and linguistic advancement at 13 months: object-referencing mothers are more likely to have children with advanced language skills, as assessed by the size of their productive vocabulary. In addition early talkers are more likely to have mothers who use a higher percent of nouns, and particularly object nouns. Such mothers are also more likely to provide descriptions and to repeat their children's nouns. They are less likely to use commands or conversational devices than mothers of late talkers. Early talkers themselves, not only have larger productive vocabularies but also have larger receptive vocabularies. The main difference between early and late talkers in terms of their comprehension is that children who are early talkers comprehend significantly more common nouns.

However, early stylistic preference amongst the early talkers is not related to maternal reference patterns or noun emphasis. The only relationship between maternal language and 13-month style is functional: mothers of children who prefer non-nouns use significantly more conversational devices than noun-producing children's mothers. The functional category of conversational devices is rather a minor category, representing on the average only 13% of all maternal utterances. It is possible that in order to break into language early, a child needs to be exposed to some minimum level of nouns, probably as object references in descriptions, and to have her own noun productions repeated. As a result the child's comprehension of common nouns will reach some ceiling level, at which point the child may evolve her own strategy, relatively independently of maternal input.

III.7 Child Language Measures at 20 months

Table 13 displays the distribution of children according to their 20-month MLUs and displays the MaxLU ranges for the distribution. Only three children had MLUs of 1.00 or less. Twenty-four children had MLUs between 1.01 and 1.50, falling into Brown's (1973) Early Stage I, and thirteen children fell into Late Stage I (MLU 1.50 to 2.00).

Table 13
Distribution of Subjects according to MLU

# of Ss	MLU	MaxLU Range
3	< 1.01	1.00
24	1.01 - 1.50	1.20 - 4.00
13	1.51 - 2.00	3.00 - 5.00
5	> 2.00	4.40 - 6.00

Five children had MLUs larger than 2.00 and thus had progressed beyond the optimal point for determining their stylistic preference. Three of those children were subjects from the subsample and, therefore, 18-month transcripts were available. Their 18-month language measures are included in Table 14 for all measures except for their MLU and MaxLU. For the other two children stylistic preference was assessed on the basis of noun and pronoun production only, (instead of noun-to-total-word ratio), using their 20-month transcripts. As a result, all measures other than noun and pronoun usage are based on a sample size of 43 instead of 45 subjects. 20-month MLUs and MaxLUs for all five children are included in Table 14.

Descriptive statistics for 20-month child language measures observed during the free-play session are presented in Table 14. It is clear that there was considerable variation between children in terms of their language abilities. On the average, children produced approximately 100 spontaneous words during the 15-minute session. However, that figure masks a range of 13 to 344 words. Mean Length of Utterance is probably a better indicator of linguistic advancement.

Table 14.

Descriptive Statistics of 20-month Language Measures

	Mean	S.D.	Range
Spontaneeous			
# Nouns	37.8	32.3	0-156
% Nouns	37.7	17.9	0-76%
# Pronouns	20.9	18.9	1-74
% Pronouns	20.7	15.0	2-49%
# Other	45.0	35.0	4-145
% Other	43.0	13.8	11-69%
MLU	1.49	.44	.70-2.90
MaxLU	2.76	1.15	1.00-6.00

(*N*=45)

Table 14 also reveals that there were strong individual differences within the sample. Using the criterion of a minimum of 60% spontaneous nouns, there were 6 referential subjects in the total sample. Twenty-five children were classified as expressive based on the criterion of 40% or less nouns in their spontaneous 20-month vocabulary. This initial finding is itself quite surprising, given that the referential style was considered the norm until individual differences were discovered by chance approximately 15 years ago. Even applying an extreme criterion of maximum 25% nouns, there are still 16 expressive children from a sample of 45 subjects.

The original 36 children who fitted into the matrix design include all 6 referential subjects and 21 of the expressive children. Figure 4 shows the distribution of referential and expressive children according to the 6-cell matrix design.

Maternal Reference at 13 months	Child's 13-month productive vocabulary: > 14 words, Common Nouns >65%	Child's 13-month productive vocabulary: > 14 words, Common Nouns <59%	Child's 13-month productive vocabulary: < 8 words
Objects	4R	5E	2R & 1E
People	2E	3E	10E

Figure 4. Distribution of referential and expressive children at 20-months according to 13-month preference and maternal reference.

Without any statistical analysis it seems evident from Figure 4 that having an object-referencing mother is a necessary but not sufficient condition for producing a referential child. However, when the distribution of referential (# = 6), expressive (# = 6) and other children (# = 3) from the top row of the design is subjected to chi-square analyses it is found that there is a significant relationship also between early linguistic preference and later style for the group of early talkers ($\chi^2(2) = 11.02$, $p < .01$).

Some of the original hypotheses can be immediately rejected on the basis of the distribution presented in Figure 4. Despite the impressive consistency in the bottom row, maternal referencing behavior alone is not a sufficient explanation for individual differences in children's language at 20 months. All five of the subjects in the top row who had a non-noun preference in their 13-month vocabularies have developed into expressive children, despite having object-referencing mothers. However, nor is the direction of control from the child, since consistent column

differences are not found. Similarly, since both styles have emerged within both the early and late talkers, individual differences are not merely the product of precocious language development. It appears that an interaction hypothesis is indeed the best fit for the data as presented. Since reliable 13-month child language measures are available for only the 18 children who are early talkers, analyses will focus on that group, in an attempt to identify the relevant variables.

III.8 Predictive Measures to 20-month Outcome for the Early Talkers

Table 15 presents the lagged associations between the 13-month reported child language measures, 13-month maternal language measures and 20-month child outcome measures from spontaneous language during the free-play session. As expected, there are significant positive relationships between 13-month stylistic tendencies and 20-month style. The percent of common nouns in the child's 20-month vocabulary was significantly related to the percent of common nouns reported by the mother in the child's 13-month vocabulary. A similar relationship was found between the percent of non-nouns at 13 and 20 months. The referential style at 20 months is also significantly related to flexible production at 13 months.

Table 15

Predictive Relations between 13-month Maternal and Child variables and 20-month Child Language

	20-month Observed Child Language		
13-month	% Nouns	% Pron.	% Other
Child Questionnaire			
Production			
% Common nouns	.56**	-.16	-.50*
% Non-nouns	-.58**	.20	.54*
% Flexible	.49*	-.15	-.34
Maternal			
% Noun	.48*	-.30	-.50*
% Descriptions	.46*	-.51*	-.14
% Comb. Ref. functions	.50*	-.38	-.25
% Performatives	-.55**	.06	.69**
% Conv. devices	-.46*	.17	.25
# Conv. devices	-.62**	.36	.39

* $p < .05$
** $p < .02$
(N=18)

As expected, there is no linear relationship between maternal referencing of objects or people and individual differences. Maternal percent of nouns at 13 months, however, is significantly and positively related to the child's spontaneous production of nouns at 20 months. Referential children, therefore, have mothers who emphasized nouns when they were younger. Several maternal functions are also related to the referential-expressive distinction. Once again, conversational devices (such as "Alright"), both number and percent, figure prominently: both are negatively related to 20-month noun preference. Percent of maternal descriptions, which was not related to noun preference for this group at 13 months, now predicts referential style almost as well as the combined referential function (which includes descriptions, referential

repetitions and referential recasts). Percent of performatives (i.e. rhymes, songs etc.) is clearly related to the expressive style at 20 months.

In the pattern of results a clear dichotomy can be found. Within the group of children who break into language early, those who become referential had referential tendencies at 13 months, and had mothers who also emphasized nouns and provided descriptions. In contrast, the expressive child avoided nouns from the start, and had a mother who was more likely to amuse the child with rhymes, peek-a-boo and other routines, and maintained contact through social routines and phrases uttered as accompaniments to the child's actions.

Mean Length of Utterance at 20 months for the early talkers is predicted best by the number of maternal object references ($r = .60$, $p = .008$), which also predicts MaxLU ($r = .50$, $p = .035$). However, the single best predictor of MaxLU is percent of maternal requests for action, which is negatively related to both MaxLU and MLU ($rs =$ -.55 and -.47, $p = .019$ and .049, respectively). Here again, there is evidence that maternal commands and directives do not promote language development. Neither MLU nor MaxLU at 20 months was related to any of the 13-month child language variables.

Since the distribution of stylistic differences within the matrix design implies that an interaction between maternal and child variables would probably predict outcome measures more accurately than either maternal or child variables alone, several interactions have been calculated. 20-month spontaneous percent of nouns will be used to indicate stylistic variation. Table 16 summarizes the associations between

interaction variables and 20-month spontaneous percent of nouns. The interaction between maternal percent of nouns and child's 13-month percent of nouns represents an improvement in predictive power over either measure alone and accounts for 41% of the variance (adjusted r^2 = 37%). The best predictor of 20-month style, however, is the interaction between percent of maternal descriptions and percent of child's nouns, which accounts for 54% of the variance in the outcome measure (adjusted r^2 = 51%).

Table 16

Predictive Relations between 13-month Interaction variables and 20-month Style

	20-month child % nouns
13-month child X maternal references	
% common nouns X % objects	.57*
% common nouns X % nouns	.64**
% common nouns X % object nouns	.62*
13-month child X maternal functions	
% common nouns X % descriptions	.73**
% non-nouns X % performatives	-.63**
% non-nouns X # sounds	-.67**

* $p < .020$
** $p < .005$
($N = 18$)

III.9 Regression analyses

In order to examine more fully the relations between 13-month child and maternal measures and 20-month stylistic variation, a series of regression equations

were computed. In all cases, 20-month percent of nouns was the dependent variable. A variable entered the final equation only if the probability associated with the F test for that variable, adjusted for the independent variables already in the equation, was less than or equal to .05. In each case reported below, examination of residuals detected no outliers and cumulative probability plots revealed that normality assumptions were not violated. Predictor variables included 13-month productive language measures from the questionnaire, relevant maternal referencing variables, significant maternal functions and interaction terms.

When stepwise regressions were run, in every case the child variable or interaction term was entered first, before any maternal variable. The four best equations are described below. Three involved interaction terms using maternal functions, and the fourth the interaction between child and maternal percent of nouns. The interaction between the child's percent of non-nouns and maternal number of meaningless sounds was entered first for two equations producing a correlation coefficient of .67. In the first equation, the maternal percent of performatives was added on the second step, producing a multiple r of .78, accounting for 61 percent of the variance (adjusted $r^2 = .55$). In the second equation, maternal number of conversational devices is added on step 2, producing a correlation coefficient of .79, which accounts for 63 percent of the variance (adjusted $r^2 = .58$). The interaction between 13-month percent of common nouns produced by mother and child is entered first on the third equation. On step 2 maternal percent of performatives is added and the multiple r is .77, accounting for 59% of the variance

(adjusted r^2 =.53). However, the equation with the most predictive power entered the interaction between child percent of common nouns and maternal percent of descriptions first, and then added maternal percent of performatives. The combined r was .81, accounting for 66 percent of the variance in child 20-month percent of common nouns (adjusted r^2 = .61). The regressions to 20-month style are displayed in Table 17 .

Table 17

Stepwise Regressions of 13-month Variables on 20-month Style

	Step	Cumulative R	R2	change	F	Beta†
Equation 1						
% Non-noun X # Sounds	1	.67	.45		12.99	-.56
% Performatives	2	.78	.61	.16	11.57	-.41
$F(2,15) = 11.57$, $p = .0009$						
Equation 2						
% Non-noun X # Sounds	1	.67	.45		12.99	-.52
# Convers. devices	2	.79	.63	.18	12.81	-.45
$F(2,15) = 12.81$, $p = .0006$						
Equation 3						
% C. nouns X % Nouns	1	.64	.41		11.12	.54
% Performatives	2	.77	.59	.18	10.66	-.43
$F(2,15) = 10.66$, $p = .0013$						
Equation 4						
% C. nouns X % Descr.	1	.73	.54		18.41	.62
% Performatives	2	.81	.66	.12	14.45	-.37
$F(2,15) = 14.45$, $p = .0003$						

† Beta after 2nd step.
($N = 18$)

Both variables in each equation make a significant unique contribution. The r^2 changes indicated in Table 17 represent the amount of variance contributed by the variable entered on the second step for each equation, when the linear effect of the other independent variable has been removed. For Equation 1, if the percent of performatives are forced to enter the regression first, it accounts for 30% of the variance and the interaction term accounts for an additional 31% of the variance. Similarly, in Equation 2, the number of conversational devices accounts for 38% of the variance, when forced to enter first, and the interaction term adds an additional 25% of the variance. For Equations 3 and 4, the interaction terms add 29% and 36%, respectively, to the variance if the percent of performatives are forced to enter first.

The results so far make it clear that stylistic variation at 20 months for linguistically advanced children is predicted best by an interaction between the child's 13-month stylistic tendencies and maternal language measures at 13 months. It should be noted that maternal percent of nouns and maternal percent of descriptions do not significantly correlate with each other for this group ($r = .37$, $p = .13$). However, both, when entered into interaction terms with child's percent of common nouns, provide significant predictors of child's 20-month style. In both cases, the addition of maternal percent of performatives, which is negatively correlated with 20-month style, provides a model with an improved fit to the data.

III.10 Maternal Language Measures at 20 months

Descriptive statistics for maternal references at 20 months during the free-

play session are presented in Table 18, which also displays the correlation coefficient between 13 and 20-month measures for each variable.

Table 18

Descriptive Statistics for Maternal References (20-month play) and Correlations with matched 13-month Variable

	Mean	S.D.	Range	R
# Utterances	286.98	94.55	69-568	.63**
# Nominals	375.31	123.17	78-681	.65**
# Noun	133.27	47.99	30-239	.51**
# Pronoun	242.04	87.23	48-449	.68**
% Noun	35.71	7.39	21-61	.51**
# Object	174.82	66.84	39-375	.60**
% Object	46.31	7.31	31-64	.23
# Person	132.87	48.05	26-285	.55**
% Person	35.51	6.33	20-47	.32*
# Object noun	86.78	38.46	24-177	.47*
% Object noun	23.20	7.08	11-47	.48*
# Person pronoun	101.42	40.62	22-233	.54**
% Person pronoun	27.04	5.63	14-38	.45*
# Object pronoun	88.16	39.46	15-212	.56**
% Object pronoun	23.18	5.95	7-35	.15
# Person noun	31.47	15.24	4-73	.50**
% Person noun	8.44	4.28	4-28	.30*
# Abstract noun	15.13	9.02	0-39	.32*
% Abstract noun	4.11	2.49	0-9	.22
# Abstract pronoun	52.51	24.63	11-145	.62**
% Abstract pronoun	14.00	4.50	6-25	.40*

* $p < .050$
** $p < .001$
(N=45)

When these means are compared with the 13-month means for the same variables from Table 8, most measures seem remarkably stable. For instance, at 20-

months mothers are producing approximately 287 utterances, containing 375 nominals, compared with 277 utterances containing 328 nominals at 13 months. Even the ranges seem similar: for example, percent of nouns at 13-months varied from 24 to 57 percent, compared with 21 to 61 percent at 20 months. Table 18 includes the correlation coefficient for each variable assessing the relationship between 13 and 20-month measures. It is more interesting to note the few variables which are not significantly related. Despite an impressive similarity between 13 and 20-month means (45 and 46, respectively) and ranges (30-72 compared with 31-64), the percent of object references in maternal language is not stable over the 7 month period. Since the percent of object nouns does correlate across the time span ($r = .48$, $p = .001$) while percent of object pronouns does not ($r = .15$, ns), it is assumed that some mothers have changed their emphasis on object pronouns. Indeed the two mothers who represent the extremes on the 20-month range (7-35%) both provided the mean percent of object pronouns at 13 months (i.e. 19%).

Correlations between 13 and 20-month variables for the group of early talkers show a similar pattern of relations. Some measures indicate even more stability within this group. For example, maternal percent of nouns ($r = .67$, $p = .002$), percent of object nouns ($r = .71$ $p = .001$), number of object references ($r = .66$, $p = .003$) and number of object nouns ($r = .67$, $p = .003$) all have larger correlation coefficients within the group of early talkers. However, for this group also, maternal percent of object references is unstable, arising again from a non-significant relationship between 13 and 20-month percentages of object pronouns.

Table 19 presents descriptive statistics for maternal language functions at 20 months, and the relationship between matched 13 and 20-month variables. Descriptions and requests for actions are still the two major functions. However, there has been a substantial increase in requests for information which now represent 13% of all utterances on the average (range 1-31%), compared with an average of 7% at thirteen months (range 0-16%). This probably reflects the fact that by 20 months more of the children are able to answer such questions, making it reasonable for more mothers to ask them. However, mothers who provided such test questions at 13 months continue to ask more of them, evidenced by the significant relationship between the number of such requests for information at 13 and 20 months ($r = .33$, $p = .026$). Both types of maternal repetitions are unstable across the 7-month time span. This finding also can be explained in terms of greater language productivity on the part of the children, allowing more mothers to repeat their children's productions.

Table 19

Descriptive Statistics for Maternal Functions (20-month play) and Correlations with matched 13-month Variable

	Mean	S.D.	Range	R
# Descriptions	52	21	3-100	.49**
% Descriptions	19	7	4-38	.60**
# Req. for information	37	22	2-112	.33*
% Req. for information	13	7	1-31	.06
# Performatives	8	7	0-33	.43*
% Performatives	3	3	0-10	.45*
# Referential repetit.	9	8	0-30	.10
% Referential repetit.	3	3	0-11	.11
% Comb. ref. functions	22	8	5-40	.66**
# Statements	28	20	7-110	.64**
% Statements	10	4	3-24	.56**
# Req. for permission	36	14	12-81	.50**
% Req. for permission	13	5	5-25	.33*
# Req. for action	54	35	16-153	.40*
% Req. for action	18	8	5-40	.30*
# Conversat. devices	36	19	9-102	.46**
% Conversat. devices	12	4	5-22	.37*
# Expressive repetit.	5	4	0-17	.24
% Expressive repetit.	2	2	0-10	.29
# Sounds	22	12	4-52	.30*
% Sounds	8	3	2-16	.31*

* $p < .050$
** $p < .001$
(N =45)

Mothers of the eighteen early talkers are less stable in their functional use of language than the group as a whole. Only five measures are related significantly: Percent of descriptions (r = .48, p = .045), percent of performatives (r = .49, p = .038), number and percent of statements (rs = .50 and .61, p = .033 and .007, respectively), and the combined referential function (r = .54, p = .022). Both 13-

month percent of descriptions and percent of performatives are variables in the best regression equation predicting 20-month style. The stability of these two variables across the time span is encouraging, since it makes it unlikely that the 13-month measures were merely artifactual findings.

It should be noted also that for the group of early talkers, maternal referencing behavior is more stable than functional use of language. Fourteen of the referencing variables correlated significantly compared with only five functions. Preference for noun or pronoun form, or object versus person emphasis, may be a maternal style that is less influenced by other variables, such as changes in the child's language abilities. In contrast, the functions of maternal utterances are more likely to change over time as the child's ability to function as a conversational partner improves. In the present study, this change is most pronounced for the early talkers, who have a mean MLU of 1.75 and a mean MaxLU of 3.70 at 20 months.

III.11 Concurrent 20-month Relations

Table 20 presents the concurrent relationships between child and maternal language measures at 20 months during the free-play session, for the eighteen subjects from the group of early talkers. Referential children at 20 months are still receiving more descriptions, more nouns and more object nouns than their expressive counterparts. There is also a trend for the maternal percent of abstract pronouns to be positively related to measures of expressive language and negatively related to referential style, although the relationship is significant only for percent of pronouns

in the child's vocabulary. At 20 months there are negative relationships between the number of non-nominals used by the child and both the number of object and the number of person references by the mother (rs = -.60 and -.69, p = .013 and .004, respectively). Expressive children may be exposed to both fewer object references and fewer person references at 20 months.

Table 20

Concurrent Correlations between 20-month Maternal Language measures and 20-month Child Language

	20-month child		
	% Nouns	% Pron.	% Other
Maternal			
% Nouns	.69**	-.63**	-.69**
# Nouns	.66**	-.37	-.72**
% Object nouns	.52*	-.45	-.43
# Object nouns	.58*	-.30	-.55*
% Abstract pron.	-.45	.53*	.37
# Descriptions	.60*	-.23	-.55*

* $p < .050$
** $p < .005$
(N=18)

When the concurrent 20-month correlations in Table 20 are compared with similar 13-month concurrent correlations from Table 10, it is clear that in terms of individual differences the mother and child are better predictors of each other at 20 months. Indeed, 20-month maternal percent of nouns is the single best predictor of referential style at 20 months, by itself accounting for 48% of the variance (adjusted r^2 = .44). However, the picture becomes clearer when multiple regressions are run using maternal 20-month language measures as dependent variables. As Table 21

shows, those maternal 20-month variables which correlate with stylistic variation are themselves predicted better either by child 13-month variables alone, or by interaction variables, than by the matched maternal measure at 13 months. These results indicate a bi-directionality of effects. In the group of early talkers, mothers and children are more matched at 20 months because their 20-month measures are related to their own similar 13-month measures and measures of their dyadic partner's language at 13 months. For both mothers and children, 20-month language measures are predicted better by 13-month child or interaction variables than by 13-month maternal variables.

Table 21

Stepwise Regressions of 13-month Variables on 20-month Maternal Language

	Step	R	R2	Cumulative change	F	Beta†
Child # non-nouns	1	.70	.50		15.74	-.59
Mat. % nouns	2	.89	.79	.29	28.61	.56
$F(2,15) = 28.61$, $p < .0005$						
Equation 1 - Dependent = Maternal percent nouns						
Child % nouns X						
Mat. % nouns	1	.76	.58		21.76	.76
Mat. # nouns	DOES NOT ENTER					
$F(1,16) = 21.76$, $p = .0003$						
Equation 2 - Dependent = Maternal number of nouns						
Child % nouns X						
Mat. % descript.	1	.72	.52		17.39	.72
Mat. # descript.	DOES NOT ENTER					
$F(1,16) = 17.39$, $p = .0007$						
Equation 3 - Dependent = Maternal number of descriptions						

†Beta after final step.
($N = 18$)

III.12 Predictive Measures to 20-month Outcome for the Late Talkers

So far the results have focussed mainly on the linguistically advanced group of eighteen children, since that is the only group for which there are reliable 13-month language measures for both mother and child. However t-tests comparing the 18 early talkers with the 18 late talkers at 20 months, indicate that both referential and expressive styles can occur in both groups. That is, while there are significant differences between the early and late talkers at 20 months in terms of the number of nouns, pronouns and other words that they produce (with the early talkers producing more), there are no differences between the two groups in terms of percent of nouns, pronouns or other words. MLU and MaxLU are significantly different: the mean MLU for the group of early talkers is 1.75 compared with 1.27 for the late talkers (t (26.28) = 3.52, p = .002, separate variance estimate), and mean MaxLU for the advanced group is 3.70 compared with 2.30 (t (28.53) = 3.66, p = .001, separate variance estimate).

Since, for the late talkers, 13-month productive language measures are not considered to be reliable, concurrent 13-month maternal and child correlations are not examined. However, the relationships between maternal 13-month language measures and the child's 20-month style, for the group of late talkers, are presented in Table 22. The child's spontaneous percent of common nouns at 20 months is significantly related to maternal percent of object references (r = .47) and percent of object nouns (r = .54). The child's 20-month style is also significantly related to maternal number and percent of referential repetitions (rs = .48). It should be noted that these are the

same variables that represent significant differences between the mothers of early and late talkers. Children, therefore, who are receiving the lowest percent of object nouns, object references and referential repetitions at 13 months, are likely to break into language later and are also more likely to adopt an expressive style at 20 months.

Table 22

Predictive Relations between 13-month Maternal and Child variables and 20-month Child Language for Late Talkers†

	20-month Observation		
	% Nouns	% Pron.	% Other
Maternal			
% Objects	.47*	-.28	-.33
% Object noun	.54*	-.35	-.37
% Person pronoun	-.45	-.04	.60*
% Ref. repetition	.48*	-.19	-.43
Child comprehension			
% Common nouns	.50*	-.22	-.43

† 7 words or less at 13 months
*$p < .050$
(N=18)

The incidence of referential repetitions raises the issue of whether this should be regarded as an indication of child influence on maternal language. Since mothers cannot repeat their children's nouns unless they produce some, the direction of control may be from child to mother. Twelve of these children had at least one common noun in their productive vocabularies at 13 months, according to the maternal reports. However, an examination of the actual 13-month transcripts revealed that not all mothers repeated their children's nouns. The children who were

receiving referential repetitions varied in production of nouns from 20 to 83%, while those who did not, had an equally large range of percent of nouns in their productive vocabulary (10-73%). The relationship between 13-month maternal referential repetitions and 20 month style, therefore, does not appear to be merely an artifact of noun use by the child at 13 months.

However, even for the late talkers there appears to be some consistency between 13-month language ability and 20-month style. While none of the productive language measures are sufficiently reliable to predict 20-month outcome measures, there is a significant relationship between the percent of common nouns comprehended at 13 months and the referential style at 20 months, for this group, as shown in Table 22. This result supports the earlier finding of consistency across the two modalities, and underlines the significance of comprehension.

While receptive vocabularies containing a large percent of common nouns tend to be associated with advanced language abilities, the percent of common nouns comprehended indicates a referential tendency even for those who do not have large productive vocabularies at 13 months. Moreover, concurrent correlations between maternal language measures and comprehension reveal no significant associations. It appears that for this group also, an interaction model is the best fit to the data, since interaction variables provide improved predictive power. Table 23 presents the relations between mother-child interaction variables and 20-month style. All child variables are comprehension measures.

Table 23

Predictive Relations between Mother-Child Interaction variables and 20-month Child Language for Late Talkers†

			20-month Observation		
13 month CHILD	X	MOTHER	% Nouns	% Pron.	% Other
Comprehension					
% C. nouns	X	% nouns	.59*	-.22	-.54*
% C. nouns	X	% obj. nouns	.64**	-.34	-.50*
% C. nouns	X	% objects	.59*	-.31	-.47*
% Non-noun	X	% persons	-.64**	.36	.48*

† 7 words or less at 13 months
* $p < .050$
** $p < .005$
(N=18)

III.13 Summary of 20-month data

The results indicate that for both early and late talkers, 20-month style of acquisition is predicted best by an interaction between maternal 13-month variables and the child's language preference at that age. For the late talkers this preference has to be assessed from their receptive language. However, in both groups, it appears that the child is apparently making an independent contribution to the outcome at 20 months, since there are no concurrent relationships between child's style and 13-month maternal language measures, except for the negative relationship between noun emphasis and conversational devices for the group of early talkers. While this relationship may explain 13-month emphasis on non-nouns for the expressive children, it hardly explains why the referential children should prefer nouns at 13 months. The results from the group of early talkers, moreover, indicate that maternal

language at 20 months is also predicted by child 13-month or interaction variables. This finding points to a dyadic system in which both partners make a contribution to the outcome variables in both maternal and child language.

While an interaction model appears to fit the data for both linguistically advanced and slower children, it should be remembered that those 13-month maternal variables which are associated with referential style for the late talkers are also variables associated with advanced language. Those children receiving more object references, more nouns, more object nouns and more noun repetitions are more likely to break into productive language quickly. The distribution of the sample within the matrix design supports this finding. Only one third of the children with person-referencing mothers fall into the group of early talkers. There is a greater likelihood that a child with a person-referencing mother will acquire language more slowly and, by 20 months, adopt an expressive style.

Despite the interaction model, it therefore appears that a mother can produce an expressive child. Children receiving a minimal input of nouns and objects, have little opportunity to prefer them. However, maternal language alone cannot guarantee a referential child, since the child may adopt the expressive strategy despite a maternal input emphasizing objects and nouns.

III.14 Context Effects

Maternal and child variables have been based on play contexts. However, if individual differences at 20 months are reliable they should exist across contexts. It is

also important to determine whether relationships between child and maternal variables are context-dependent. It is therefore necessary to examine the associations between variables across contexts, and also to compare the play session with the meal session in order to identify differences between the two settings. Child variables are examined first, followed by similar analyses of maternal variables, in order to assess the stability of maternal variables, and the differences in functions and references elicited by the two contexts. In addition, comparisons have been made for maternal measures between the early and late talkers in the meal context.

While there was no problem in obtaining a fifteen minute play segment of mother-child interaction focused on the toys provided, mothers of some children found it difficult to keep them in their high-chairs for the full fifteen minutes required for the meal session. At 13 months there were thirteen children who had short meal sessions lasting less than 15 minutes. The data for twelve children, who were able to produce at least a 10-minute meal session were prorated accordingly and included. One dyad failed to provide even ten minutes of interaction and the data for that mother and child were excluded. Similarly, at 20 months, 13 children had short food sessions. The data for one dyad was excluded, since they produced less than 10 minutes of interaction, and the data for the other dyads were prorated and included in the analyses. The excluded dyad differed for the two data points, and only 5 children had short food sessions at both 13 and 20 months. The sample size for context comparisons at each data point is therefore 44 dyads.

Context Effects on Child Language

In order to assess the effect of context on child language, and indeed to check on the stability of individual differences, the relationship between 20-month language produced during the food and play contexts by the early talkers was examined. Table 24 presents the cross-context relations between 20-month child language measures.

Table 24

20-month Relations between Child Language in Play and Food Contexts

	Food context					
	%nouns	%pron.	%other†	MLU	MaxLU	%Imit.†
Play context						
% nouns	.64**	-.44	-.65**	-.19	-.18	.23
% pronouns	.06	.63**	.59*	.37	.47*	.13
% other†	-.56*	.57*	.43	.46	.44	-.48
MLU	.25	.37	-.08	.85**	.81**	-.54*
MaxLU	.08	.47*	.10	.91**	.87**	-.49
% imitations†	.36	-.36	-.28	-.38	-.47	.75**

* $p < .050$
** $p < .005$
($N = 18$)
† Based on an N of 16

It is clear from Table 24 that there was considerable consistency across contexts. Children who were referential during the play session tended to emphasise nouns during the meal session also ($r = .64$, $p = .004$). Pronoun emphasis was equally consistent across contexts ($r = .63$, $p = .005$). The use of non-nominals during play tended to be more closely associated with the use of pronouns during the meal session ($r = .57$, $p = .022$), than non-nominals ($r = .43$, $p < .10$). MLU, MaxLU and percent

of imitations were highly correlated across sessions. For both sessions, pronoun use correlated significantly with MaxLU (rs = .47), although there were no significant relationships between either style and MLU. The association between pronoun use and MaxLU may reflect the use of stereotypical routinized phrases, longer than their average utterance, for the expressive children.

Noun emphasis in one context was consistently negatively correlated with non-nominal emphasis in the other context. Pronoun emphasis positively correlated with each other across contexts. Overall, this pattern of correlations indicates that stylistic differences are a robust finding, and not simply the product of a particular context.

When the child language variables between contexts were subjected to analyses by t-tests, only two differences were found: Children used a larger number of pronouns and imitations during the free-play session. All other language measures revealed no differences between the two contexts.

Context Effects on Maternal Language

Throughout the results so far, maternal language measures have been reported from the free-play sessions at 13 and 20 months. The free-play sessions were considered to be the optimal situations for differences to occur, based on other research findings that indicated that caretaking sessions are too structured for variability to emerge. However, the current study was designed to permit the comparison of maternal language between free-play and caretaking sessions.

Comparisons between maternal referencing behavior across contexts are examined first, including a comparison between maternal measures from the 13-month play and food contexts as predictors of 20-month stylistic variation. Functional analyses of maternal language across contexts are then presented.

Correlations across contexts at 13 months for the entire sample of 45 children revealed that mothers are remarkably consistent in some measures (see Appendix F). Maternal number of utterances, nominals, nouns, pronouns, object references, person references, object nouns and person pronouns correlated across contexts with coefficients varying between .71 and .85 ($p < .0005$). Maternal percentage of nouns, object nouns, person references and person pronouns were also significantly related across contexts ($p < .020$). However, percent of object references and percent of object pronouns were unstable. Object pronoun use seems to be a less stable characteristic across contexts and over time than object noun use.

When differences between the two contexts were compared, the play context was found to elicit more utterances (t (43) = 6.55, $p < .0005$), and therefore more nominals (t (43) = 5.57, $p < .0005$). Both nouns and pronouns were affected (ts (43) = 5.08 and 3.79, respectively, $p < .0005$). Mothers also used more object references during the play context (t (43) = 6.63, $p < .0005$). Both noun and pronoun object references increased for the play condition, and while the number of person references was not significantly different across contexts, the percentage of person references differed as a result. Mothers used a significantly lower percentage of person references during the play session (t (43) = -6.95, $p < .0005$) and this was particularly marked

for percentage of person pronouns (t (43) = -9.66, $p < .0005$).

For the early talkers, there was no significant relation between maternal reference variables from the food session and the child's 13-month percentage of common nouns. This finding is consistent with the play session, where no significant association between maternal references and 13-month stylistic tendencies was found. Stylistic variation at 20-months, (assessed by spontaneous percent of nouns), was significantly related to maternal percentage of nouns during the 13-month food session ($r = .56$, $p = .020$). Maternal percentage of nouns during the free-play session was the only 13-month referencing variable that predicted 20-month outcome for this group (see Table 15). In fact, the maternal percentage of nouns from the food session was a better predictor of 20-month style than the maternal percentage of nouns during the play session ($r = .48$, $p = .042$). Similarly, an interaction between the percentage of common nouns produced by the child and maternal percentage of nouns during the food session was a better predictor of stylistic variation at 20 months than a similar interaction variable based on the play session ($r = .68$, $p = .003$). Thus it is clear that the relationship between 13-month maternal percentage of nouns and 20-month style is not context-dependent.

While object referencing overall tends to be suppressed in the food context, for those children who had larger 13-month vocabularies, even the food context provided more object references than for the late talkers. *T*-tests support this conclusion. The maternal input for early talkers contained a significantly higher percentage of both nouns and object nouns in both contexts than the input for late

talkers. During the food session, mean percent of nouns for early talkers was 37%, compared with 33% for late talkers (t (33) =2.11, p = .043). The children in the early talkers' group were being exposed to a higher mean percent of nouns during the meal session than the mean percent of nouns for the late talkers' group during their play session. Mean percent of object nouns was 24% for early talkers but only 20% for late talkers (t (33) = 2.05, p = .049). Again, early talkers had a higher mean percent of object nouns for their meal session than late talkers had for play. Children in the group of late talkers were exposed to a significantly higher percent of abstract nouns and pronouns during both sessions (t (play) = 2.64, p = .012; t (food) = 2.31, p = .028).

For the total sample of 45 children, all 13-month maternal functions of utterances (both in number and percent) are significantly related across the two contexts, except for number and percent of performatives. However, the coefficients for functions tend to be lower than those for maternal references. For example, the correlation for percent of descriptions is .38 (p = .010). Percent of conversational devices correlate .58 (p < .0005) across contexts, while percent of requests for action correlate .45 (p = .002).

Pairwise t-tests between contexts at 13 months reveal significant differences for practically every function. During the play session mothers provide more descriptions (t (43) = 8.61, p < .0005), more requests for information (t (43) = 3.89, p < .0005), more performatives (t (43) = 5.52, p < .0005), more referential repetitions (t (43) = 2.13, p = .039), more requests for action (t (43) = 4.81, p <

.0005) and more sounds (t (43) = 3.63, p = .001). The play context also elicits fewer requests for permission (t (43) = -5.57, p < .0005) and fewer conversational devices (t (43) = -2.20, p = .033). Thus maternal language functions appear to be susceptible to the effects of context. Mothers tend to ask different types of questions in the two situations. During meals, questions which require only a "yes/no" response are asked three times more often than questions which require the child to provide information (means = 39 and 13, respectively). Mothers repeat their children's expressive utterances during the food session, but during play are more likely to repeat their children's nouns. Descriptions represent the single largest function during play (21%), with requests for action following close behind (20%). However, during meals, conversational devices (18%), requests for permission (18%), requests for action (17%) and statements (15%), all outnumber descriptions (13%). The mean number of descriptions in the play context is twice the mean number for food: 58 compared with 30.

There are no significant relationships between the child's stylistic tendencies at 13 months and maternal functions during the 13-month food session. Lagged correlations between maternal 13-month functions during the food session and children's 20-month style, for the group of early talkers, reveal only two relationships. Maternal percent of performatives is positively related to 20-month style (r = .61, p = .009), while percent of sounds during the food session is negatively related (r = −.54, p = .027). The relationship to percent of performatives is an interesting finding, since the direction of association changes with context. It appears that mothers who

sing songs, tell rhymes, play peek-a-boo and otherwise divert their children's attention, while there are objects around which they could be naming and describing, tend to have expressive children. However, the same behavior during the meal session seems to be conducive to the referential style, perhaps because the category includes book-reading, which may be more stimulating than discussing the food.

Despite the reduction in maternal descriptions during the food session, when the group of early talkers is compared with the group of late talkers, it is found that early talkers also receives more maternal descriptions during the food session. The mean number of maternal descriptions during food for early talkers is 36, compared with a mean of 24 for late talkers (t (25.76) = 2.20, p = .037, separate variance estimate). Percent of maternal descriptions are also significantly larger for the group of early talkers (t (25.63) = 2.49, p = .020, separate variance estimate). Number and percent of referential repetitions also differ for the two groups, as would be expected.

Summary of context effects

In summary, the comparison of maternal language across the two contexts indicates that functions are affected more by context than references. Mothers emphasize objects more during the play session, and also talk more, thereby inflating the number of all types of references. However, there were many more differences in maternal functions across contexts. This is consistent with the earlier finding that references were more stable than functions over the 7-month time span of the study

for the group of children who were early talkers.

Children who have already broken into productive language at 13 months are consistently receiving a different maternal input from their slower counterparts. Even in the food context, early talkers are exposed to more descriptions, referential repetitions, a higher percent of nouns and a higher percent of object nouns. Finally, the comparison of child language across contexts indicates that the expressive and referential styles are robust findings.

III.15 Differential Maternal Effects

The results so far have indicated that stylistic variation at 20-months is related to an interaction between maternal and child precursors. However, as discussed in chapter 1, the significance of individual differences extends beyond the phenomenon itself. Attempts to demonstrate the effectiveness of motherese have met with mixed success and many researchers have concluded that maternal input may play a limited role in language acquisition. One of the aims of the current study was to explore the possibility that individual differences play a role in masking motherese effects. For example, it is possible that a particular maternal behavior may indeed be facilitative for referential children, while having no effect for expressive ones. In order to address this question, the sample has been divided according to 20-month stylistic preference: the expressive group contains all 25 children with 20-month noun-to-total-

word ratios of 40% or less. The remaining 20 children are referred to as the referential group, although only 6 are referential according to the criterion of 20-month noun ratios of 60% or more. Twenty-month MLU is being used as the index of grammatical development.

Before discussing the relations between maternal 13-month language measures and 20-month MLU for each group, it should be noted that each group contains children from the cells of the design containing early and late talkers. The distribution of children is remarkably even: The expressive group contains 10 early talkers, 11 late talkers and an additional 4 children who fell into neither group. The referential group contains 8 early talkers, 7 late talkers and 5 of the remaining children, who had vocabularies of between 8 and 14 words at 13 months. The mean MLUs for the groups are similar: the expressive group has a mean MLU of 1.52, (standard deviation = .35), while the referential group has a mean MLU of 1.44, (standard deviation = .52). The expressive group has a range of MLUs from 1.04 to 2.62, while the referential group ranges from .70 to 2.90.

Table 25 presents the relations between maternal 13-month language variables, and 20-month MLU for each group. It is evident that there is a significant positive relation between maternal use of nouns, objects, and in particular, object nouns, and the size of the child's 20-month MLU for the referential group, while no such relations exist for the expressive group. Similarly, for the referential group, maternal percent of abstract nouns and pronouns is negatively related to MLU, while no significant association is found for the expressive group.

Table 25

Differential Maternal Effects on 20-month MLU

Maternal 13-month	20-month MLU R group (*N*=20)	E group (*N*=25)
References:		
# nouns	.53*	.16
% nouns	.49*	.05
% objects	.66**	.32
# obj. nouns	.70**	.24
% obj. nouns	.64**	.23
% abstract	-.45*	-.09
Functions:		
# descriptions	.44*	.30
# ref. repetitions	.89**	.42*
% ref. repetitions	.79**	.49*
# conv. devices	-.44*	-.05
% conv. devices	-.54*	-.15

* $p < .050$
** $p < .005$

Table 25 also presents the associations between maternal 13-month language functions and 20-month MLU. Here also there are differential effects depending on the group. Within the referential group, children being exposed to more descriptions tend to have more advanced language skills at 20-months, indexed by a higher MLU. However, within the expressive group there is no significant relation between maternal descriptions and the size of the child's MLU. Number and percentage of referential repetitions are related for both groups to MLU, although the relationship is stronger for the referential group. Maternal use of conversational devices (both number and percent) at 13-months is negatively associated with MLU at 20-months for referential children, but no significant relations exist for the expressive group.

It appears that maternal variables not only interact with child variables to predict individual differences in children's styles of acquiring language, but also that maternal variables have differential effects upon language development depending upon the strategy adopted by the child. These results support the earlier contention that it may be impossible to demonstrate consistent motherese effects unless individual differences are taken into account.

III.16 Individual Profiles of Language Development

Descriptive and inferential statististics based on group data are a necessary means for summarizing results. Insights are gained which cannot be reached by merely examining the transcripts. However, the opposite is also true, particularly when the focus of the study is individual differences rather than a search for universals. The following section of the results will focus on one child who was an early talker, from each cell of the subsample matrix design. No claim is being made that each child is representative of the others from the cell. Each mother-child dyad appears to function as a unique system. However, within each cell a child has been chosen to "put flesh" on the statistics presented, and in some instances the qualitative information reveals that statistics can be misleading.

Ashley - (row 1, column 1)

Ashley represents an excellent example of a referential child. At 13 months, Ashley fell into the group of early talkers, with a reported productive vocabulary of

30 words, 21 of which were common nouns (70%). Only three of her remaining nine words were non-nouns, (Hi, hot and peek-a-boo), and the other six were all proper nouns. Her nouns included the usual objects (e.g. bottle, ball, book), animals (e.g. dog, duckie) and foods (e.g. apple, juice) that are characteristic of early vocabularies. However, Ashley also produced a few unusual ones, such as "airplane", "rock", "bug" and "toys". Her receptive vocabulary was composed of 53 words or phrases, with 23 common nouns. She understood roughly as many non-nouns as nouns, including many simple instructions such as "throw", "come here", "give" or "look".

At 13-months, Ashley's mother had a clear preference for object-referencing. She was not a prolific talker, producing 286 utterances, which is just over the mean number of utterances for the play session. One-hundred and seventy-one of her 295 nominals were nouns (57%). Two-hundred and eleven of those nominals were object references (72%), one-hundred and fifty-four of them being object nouns (52%). Only 7% of Ashley's mother's nominals were abstract nouns or pronouns. Thirty-six percent of her mother's utterances were descriptions (104), and the next largest category was requests for action, which represented only 12%. She repeated 16 of Ashley's nouns (6%). Ashley's mother clearly fits the characterization of the mothers of the early talkers: object-referencing, providing descriptions and using nouns, particularly object nouns.

Ashley's language development over the 7 months of the study is a classic example of the alleged 'universal' pattern, progressing from a single-word period to multiword utterances. Her observed language at 13 months supported her mother's

estimates: Nouns represented 74% of her vocabulary, and Ashley produced eleven of those mentioned by her mother, including "airplane", "bug", and "rock". With a Mean Length of Utterance of 1.05, Ashley produced only one phrase during the two fifteen minute sessions: "Go byebye".

Multiword utterances started to appear at the 16-month sessions. During 45 minutes of taping, Ashley produced 105 multiword utterances (57 different ones), and 86% of those contained nouns. Most were two-word utterances (97%), although some contained three morphemes because Ashley had started to use the plural 's', e.g., "two birdies", "two knees". Ashley's multiword utterances contained some of the common formulae that Braine (1976) claims are shared by children at this stage. Ashley drew attention to objects (e.g., "See mirror", "Here cup"), remarked on properties of objects (e. g., "Good din-din"), expressed plurality and iteration (e.g., "two birdies", "two money", "and cookie") and noted recurrence or alternate exemplars (e.g., "more din-din", "udder birdie"). Ashley also commented on negation, a category which Bloom et al. (1975) list (along with existence and recurrence) as one of the earliest emerging semantic categories. Ashley discussed "no money", when she was unable to find any, and said "no birdie" and "went bye-bye", when the birds had flown away. Bloom et al. claim that verb relations expressing action events follow these early categories, and precede those encoding state events. However, by 16 months Ashley expressed both. While trying to seat a doll on a bus she said, "sit down", for example, and she told her mother to "make coffee" and "Give me Ernie", and commented on her food, "eat tuna". She also used the verb

"see" (as in "see din-din") which Bloom would consider an example of a state event. Moreover, Ashley clearly expressed internal states, saying "want coffee". Ashley did not use instruments or datives, but she did ask Wh-questions, which Bloom et al. claim emerge late. She asked many 'Where' questions, such as "Where Mick-Mick?", "Where coffee?" and, while looking in a mirror, "Where's Ashley?". She seemed to have a well-developed sense of self, and at one point told her mother, "Me Ashley".

Ashley's earliest multiword utterances seem to follow a pivotal strategy. A combination of 'verb' + X, "more", "and" "where" or "no" + X, and 'adjective' + X, (where X stands for a noun), accounts for 70% of all her 16-month multiword utterances. It is evident that Ashley's use of language is predominantly to discuss objects in the world. This emphasis on objects continues throughout the 18 and 20-month transcripts. By 18 months Ashley had an MLU of 1.48, and a MaxLU of 3.27. As her utterances increased in size, she included her first preposition, "Birdie on head", and the adverb "down", in "Get down" and "Bend down". Ashley also started to refer to herself as "I". Both uses of "I" expressed her wants: "I want coffee" and "I want lunch". However, she continued to refer to herself usually as "Ashley", as in "Ashley do it". This phrase, which Ashley used with other persons named as the agent, appears to be another pivotal strategy in her language, and was the first use of "it" in all her transcripts. It is interesting that even now, Ashley is not using "it" to refer to an object but to an action. Nouns still accounted for 66% of Ashley's total words, and 93% of all her multiword utterances contained at least one noun, while some contained two. Her earlier pivotal strategies still account for 60% of her 18-

month utterances. It is possible that Ashley is beginning to apply other rules to her language production, since she now starts to invent her own words. While removing a toy fish which was hung on a knob, Ashley said, "Fish offsy", and when she wanted to hold an egg or the butter, she pleaded with her mother, "Holdy egg" and "Holdy butter". It is not clear what distinction Ashley was trying to mark with this idiosyncratic ending, however, it appears to be intentional, since Ashley has always had very clear articulation.

By 20 months Ashley's MLU had increased to 2.75, with a MaxLU of 5.20. She used 149 multiword utterances during the two fifteen minute sessions, and few single-word utterances. Ashley had moved beyond the optimal stage for detecting individual differences, since she was now talking in sentences. However, her noun to total nominals ratio was still high, 81%. Ashley appeared to be using the plural 's' productively, and overextended it, saying "Fives" to refer to five toy people, and "Ins" after she had put them all in the bus. During the play session, her mother commented on how Ashley's attention span had increased dramatically, and indeed Ashley spent 13 of the 15 minutes of the session providing a narrative for her actions as she removed and replaced people in the bus, which she referred to as a train. She identified the characters, "It's a man", "A little guy", " A little dog" "A little girl", "The boy", "The baby", and created a story around her actions. The people "jumped in train" and "jump out" of the train, they were "laying down", "fell down", "and jumped down", and even "Jumped in pool" as the fantasy changed. Ashley counted them as she took them in and out, and renamed them with the names of people she

knew. Clearly, Ashley was now using constructions specifying place of action ("Boy go on train", "Man in pool"), and datives ("June bring toys Ashley"), both categories which emerge late, according to Bloom et al. While she now used many pronouns (this, that, it, he, they and I), Ashley was also elaborating noun phrases and her attention was still focussed on objects. She discussed objects and actions with her mother, whose comments were closely matched to Ashley's focus of interest. She elaborated on Ashley's utterances (e.g. "The man jumped in" or "Five little people on the train"), provided exact repetitions (11% of her utterances) and related Ashley's play to her prior experiences. For instance, Ashley's mother reminded Ashley of her own trip by train to Florida to see her grandparents, and questioned her about her experiences of swimming in a pool.

An examination of the functions of her 20-month utterances indicate that Ashley is focussed on the world and describing its contents. Ashley relied heavily upon the mathetic functions. The category of Commenting, which involves describing a property or action of an object, accounted for 64% of all of Ashley's utterances, and Naming accounted for a further 18%. Pragmatic functions represented less than 7% of her spontaneous utterances during the free-play session.

During the meal session, apart from discussing the food and who was to do the feeding ("I want Ashley do it!"), Ashley and her mother had an extended dialogue about an event in the past. They discussed a trip to the zoo with her grandparents, and Ashley contributed several independent items of information to the discussion. When her mother mentioned seeing a whale jump out of the water, Ashley

added, "And touch a balloon". At several points Ashley kept the conversation going by offering a new topic, such as "We saw seals", or "and sharks". At another point her mother also rehearsed a future event (a seaside vacation) with Ashley, by iterating the kinds of things she would see and do.

Ashley is clearly a noun user throughout the period of study. There is a gradual increase in her MLU and decrease in the number of single-word utterances, indicating a steady progression through a one-word and two-word stage, to multiword utterances. Even at 20 months Ashley used few pronouns, but she appeared to elaborate the noun segment with adjectives (e.g. "A little dog") and possessives (e.g. "Harry's hat"). Ashley's earlier pivotal strategy no longer accounted for the majority of her multiword utterances. She seems to have shifted to the more categorical strategy which is necessary in order to use language productively. Many sentences follow the standard subject-verb-object paradigm, with different exemplars for all three components. By 20 months she has progressed to discussing non-present objects and events with her mother, and she has an extensive vocabulary which includes nouns like 'eskimo ', 'piano' and 'lady'. She is a classic example of a referential child.

Brady (row 1, column 2)

Brady's mother, like Ashley's, emphasized objects at 13 months. Of her 250 nominals, 56% were object references (141), the fourth highest percentage for the whole sample of 45 children. However, only 98 of those nominals were nouns (39%) and object nouns accounted for only 32% (79). Forty-four out of 229 utterances were

descriptions (19%), and requests for actions accounted for another 17% (40). On the questionnaire, his mother reported that Brady himself had a productive vocabulary of 31 words, fourteen of which were common nouns (45%). He had almost an equal number of non-nouns (13) which included some phrases: "thank you", "how pretty" and "What's this?". His mother commented that Brady sometimes imitated whatever she said. His comprehension of 50 words, included 23 common nouns and 22 non-nouns.

However, on the 13-month transcripts Brady produced only one noun ('toot-toot' for train), and that was within 5 utterances of his mother's use of the word. His noun-to-total-word ratio was 7%. He produced 13 multiword utterances, all of which were routinized phrases containing several pronouns (e.g. "More this", "Whatsat?", "Thank you", "Don wan it", "I see you"). Like his multiword utterances, his single-word utterances were predominantly social (e.g. "Hi", "No", "Good") or pronoun references ("dat", "udder"). Brady had the classically poor articulation of an expressive child, combined with an emphasis on intonation, as if the meaning could be communicated totally through that channel. His mother commented on tape that Brady was learning Chinese.

This discrepancy between Brady's observed language and the maternal report does not necessarily indicate that his mother was wrong. Brady may indeed have had the nouns she identified within his productive vocabulary. The reported and observed language measures provide essentially different information: the transcript provides frequency data, while the questionnaire fails to distinguish between a word that is

used rarely and a phrase that might be repeated several times per hour. It is also possible that Brady's mother was predisposed to look for individual words in Brady's speech, and noticed the 'normal' common nouns whenever he used them, but dismissed his longer productions as mere babbling.

At 16 months Brady produced 49 multi-word utterances, only one of which contained a common noun ("No juicey"). His noun-to-total-word ratio was 5%, and this increased slightly to 16% by 18 months, when Brady started to use typical early nouns like 'baby', 'ball', and 'dog'. The number of multiword utterances had reduced by 18 months to only 18. However, this apparent regression masks a real development in Brady's productive language. Brady seemed to go through a process of using a routinized phrase prior to using the constituent words of the phrase. The individual words began to be used independently at the same time as Brady started to make substitutions and to amalgamate different phrases. Only after Brady had successfully taken apart and played with the formulae did he start to build productive phrases by inserting nouns into the slots previously occupied by pronouns. For instance, at 13 months Brady produced "Eat this", "More this", "I see you", "don wan it" and "I do another one". By 16 months "I see you" had been broken down into "I see" and "See you", and combined with the other frames to produce "See this". 'This' had also moved to produce "This in" and "This is", and by 18 months "this" appeared in isolation, along with the phrase "I want this". By 20 months, although Brady's noun-to-total-word ratio was only 9%, Brady was entering nouns into the phrases: "This is car", "This spoon", "This is juice", and "This juice

good". The "I see" formula by 20 months allowed Brady to insert nouns, as in "See the window", "See,see motor" and even "I see yous tomorrow". The 13-month, "Don wan it", picked up the "I" from other phrases to become "I want out", and "I want this" at 18 months, when "I" appeared in isolation for the first time. By 20 months Brady was producing "Want more", "Don want those", "Want some", as well as "I want juice", "Want more juice" and even "More want juice". "Juice" was also used independently for the first time on the 20 month transcripts, although most of Brady's individual words were still social (e.g. Look, here, no, yeah, 'kay, bye-bye, good).

Brady obviously did not follow any fixed position or pivotal strategy, nor were his early constructions categorical. Brady's single words were rarely verbs (only "broke", "push", "look" and "eat" occur at all), while many different verbs were used in multiword utterances from 13 months, with no consistent pattern for constructing such utterances. Variants on the "I did it" phrase for instance included, "I do it", "Brady did it", "I do", "Me do", "Brady did","Brady do meself", "Do it", "Did it" and "I do another one".

Brady did not impose a form to function rigidity on his utterances. The same phrase could function as a question or as a statement depending on intonation alone. Indeed, Brady seemed throughout to understand the use of intonation and used language to communicate his needs and feelings, but paid little attention to form. Many of his unintelligible strings were clearly marked by intonation as questions, emphatic demands or even explanations, and at times he seemed frustrated by his

mothers' inability to execute his demands. It is equally clear that Brady's focus of attention was not on objects and discussing the world around him, but rather on his own wants, needs and directing his mother to satisfy them. An examination of the functions of Brady's utterances during the 20-month play session indicate that 76% of his intelligible utterances served pragmatic functions. Brady used language to express wants, to regulate his own behavior, and attempted to regulate the actions of others. The single largest category was Interactive: Establishing contact accounted for 32% of all his intelligible utterances.

There is also some indication that Brady may not have realized that language may have a referential function. For example, at 20 months Brady happily exclaimed, "I did it!" each time his mother demonstrated how to fit the shapes through the lid of the shape-sorter. On one occasion his mother challenged him, "You did it? What did you do?", while on another she contradicted him, "You did not do that." However the veracity of Brady's exclamations are irrelevant. For Brady, language may merely be 'something you do' in the appropriate context, and when the shape is successfully inserted, "I did it!" is the right exclamation, (even if you didn't!). At 18 months Brady used both "I want" and "I need", clearly encoding state events. Despite Brady's impressive ability to imitate routinized phrases, he presents a paradox because he was not good at imitating on request. His mother occasionally asked him to repeat a word, and his attempts were very far from the model.

While Ashley and her mother engaged in a dialogue, discussing past and futute events, Brady and his mother spent the 20-month meal session negotiating. A

sample of their transcript should illustrate this point.

Child		Mother	
Action	Vocalization	Action	Vocalization
points	What dat? /		
			What is "What is that"?/
	Want more/		
			More?/
		points	You have all of this there/
		points	You eat that/
			And then I'll give you more/
	Want more!/	eating	
		points	You eat this first!/
pulls back	Don'want to/	offers food	What?/
	(incomp)		
			Brady/
			Eat that/

Unlike Ashley, whose progress to multiword utterances passed through clear stages with a concomitant increase in MLU, Brady's MLU was relatively stable

throughout the 7 months of the study. For example, during the play sessions, Brady had an MLU of 1.63 at 13 months, 1.81 at 16 months, 1.54 at 18 months, and 1.60 at 20 months. His MaxLU, already high at 13 months (2.80), increased to 3.90 by the 20-month visit. The differences between his MLUs and MaxLUs indicate Brady's reliance on routines from the first session.

At 13 months, during the play session, Brady's mother was object-referencing: 56% of her nominals referred to objects compared with 30% person references. However, by 16 months she had shifted her emphasis. Forty-eight percent of her nominals now referred to people, compared with only 33% object references. This shift was maintained through the 18 and 20-month visits. Where Brady had been exposed to 32% object nouns initially, by the 16-month visit this has dropped to 19%, with a corresponding increase in percent of person pronouns (from 24% to 38%). By 20 months, there was little change, with person pronouns accounting for 38% (144) of all nominals, and object nouns only 20% (75). Brady's mother contributed to the instability in object referencing found for the group of early talkers. It seems that in the face of Brady's overwhelming disinterest in objects and in naming them, that his mother abandoned her earlier strategy and engaged in more social interaction. After the 13-month visit, Brady's mother consistently used more conversational devices than descriptions during the free-play sessions. It is possible that this was a reaction to Brady's garbled language: when she was unable to understand what he had said she may have provided a filler, such as "Okay" or "Alright". Her use of empty conversational devices may also have influenced Brady. She was providing

many examples of language which has no reference, and so it is hardly surprising if he concluded that some language at least is merely the expression of shared emotions in the appropriate context.

Katharine (row 2, column 2)

At 13 months, Katharine's mother reported that Katharine had a productive vocabulary of 20 words. Only five (25%) of these were common nouns (baby, ball, bear, bow-wow and moo), while eleven were non-nouns and four were proper nouns. Her non-nouns included some verbs (give and kiss), but were mainly social routines (e.g. Hi, bye-bye, Uh-oh!, yes, no) and included two questions (What's that?, Where's?). Her receptive vocabulary was composed of 71 items; 37 non-nouns and 28 common nouns. Evidently Katharine had expressive tendencies, and her mother's report was confirmed by Katharine's observed behavior. On the 13-month transcript she had a noun-to-total-word ratio of just 21%, and she used three social routines ("Thank you", "Whatsat?", and "You're welcome").

Katharine's mother herself was not a noun-user. At 13-months, during the play session she produced 282 nominals, but only 33% of those were nouns (94). Katharine's mother also emphasized persons: 44% of her nominals referred to people, compared with 40% object references, and object nouns accounted for only 22% (61) of all her nominals, while person pronouns represented 36%. Her tendency to emphasize persons was maintained throughout the study. At the 16-month visit, during the play session, which is the context most likely to elicit object-referencing,

57% of her nominals referred to people, compared with 27% object references, and object nouns accounted for only 14% of her nominals. At 18 and 20 months her person references were 50% and 45%, contrasting with 35% and 38% object references, respectively. Object nouns represented only 17% and 18% of all nominals for the 18-month and 20-month play sessions. Katherine's mother provided 38 descriptions (18%) during the 13-month play session. She used an equal number of statements (39) and conversational devices (38), while her single largest functional category was requests for action, which represented 22% of all her utterances. She was remarkably consistent across the four visits: descriptions, for example, represent 21%, 16% and 17% of her utterances at 16, 18 and 20 months, respectively.

Like Brady, Katharine provided many unintelligible utterances, which sounded as if Katharine was trying to produce the whole sentence before she could clearly articulate the individual words. At 16 months during the play session, for example, 18 of her 59 utterances were incomprehensible (31%), while Brady produced 39 incomprehensible utterences from a corpus of 66 (59%). In contrast, Ashley produced 101 utterances during the same session, but only 13 of those were incomprehensible (13%). During the three fifteen-minute sessions at 16 months, Katharine produced 23 multiword utterances, only one of which contained a common noun ("Another book"). Some were focused on social interaction (e.g. "Go away", "Dada's here", "Mammy no"), although some contained pronominal references to objects (e.g. "This one", "Another one", "What is it?"). Katharine also appeared to pick up some routines and used them appropriately in context.

During the 13-month and 16-month visits, Katharine's mother played with the toy telephone. On both occasions she used exactly the same routine as she talked into the receiver:

Action	Vocalization
Into receiver	Hello/
	D'you wanna speak to Katharine?/
	Yeah/
	She's here/
Offers it to K	They wanna speak to you/

Katharine herself, during the 16-month visit, picked up the receiver, and after saying "Hello" several times, put it down. Her mother asked, "Anybody there?", and Katherine said, "Nobody's there", shaking her head slightly. A few minutes later, when she picked it up again and said, "Hello", her mother asked again, "Anybody there?", and then answered herself, "Nobody's there". Katharine's mother seemed to use repetitive utterances, which may have made it easier for Katharine to pick them up. At 18 months she produced a shorter version of the above routine, and Katharine produced several different versions of "See you later" while talking on the phone. By 20 months, Katharine was talking extensively into the telephone. Many of her utterances were unintelligible, however, she did manage to carry on a short dialogue including saying "Hi", "Hi" and "I got it". She asks, "What's?", "May I speak man

again", "No?", "What's your name?", ending with, "What's you bye". These utterances are too similar to the type of phrases we all use on the telephone to be merely coincidental. Katharine was trying to sound like people she had heard. She finished with "bye", although it made no sense in the utterance she produced, presumably because that is how she had heard all phone conversations end.

Like Brady, Katharine appears to go through a process of using a stereotypical phrase prior to breaking the phrase down into its component parts and then recombining those parts productively. The study is based on samples of child language, not complete data. However, when we trace the evolution of the components of her phrases in the samples available it is interesting to find that in no case does a constituent word appear in isolation prior to its use in a routine phrase. Moreover, nouns are inserted into those phrases and used independently at the same time. Katharine did not pass through a one-word stage, leading to a two-word stage by a process of synthesis. For example, at 16 months, Katharine used the phrases "Nobody's there" and "Mommie there". She was also using "Mommie" in isolation at 16 months, which may have enabled her to compare the two phrases and separate the components. By 18 months Katharine had broken "Nobody's there" apart and used both "Nobody" and "There" independently. At the same time she produced "Spoon in there" and "Right there".

Similarly, at 18 months Katharine used a variety of "see" phrases : "See you later", "See you again" and "See tomorrow". By 20 months Katharine had isolated "See" from those routines, used it in isolation, and recombined it in several

productive ways, resulting in state event utterances. She instructed her mother to "See toys", "See flowers", "See house", "See tree" and "See this car". "This" had previously been used only in phrases ("This one" and "This another") at 16 months, but by 20 months Katharine used "This" independently and inserted it into phrases.

It is possible that a comparison across utterances may be facilitated by having many routines containing the same words, leading to the discovery of the component units. At 16 months Katharine produced "Other one", "This one", "This another", and "Another one". During the same session she said both "Another", and "Another book", which was her first multiword utterance containing a common noun. Katharine did not seem to follow Bloom et al.'s sequence of producing multiword utterances expressing action events prior to state events. She talked about "Dada's here" and "Mommie there" at 16 months, and at 18 months she commented, "Spoon in there". She also kept telling her mother to 'see' things, producing another type of state event, called a notice utterance. Her only encoding of an action event occurred at 20 months when she produced, "I got it", but this appears to be part of her telephone routine, and may not be a productive construction.

By 20 months, while Katharine was still using social routines, such as "Good grief", "Wanna bite?", "Some more?", "Thank you". "That's delicious" and "I got it", she appears to have had an explosion of nouns in her vocabulary. She uses 59 in the play session alone, and her noun-to-total-word ratio of 46%, placed her just beyond the criteria for an expressive child. Nouns were occurring in multiword utterances (e.g. "See toys","Nice toys", "And toys", "Pretty toys" and "These toys"),

but many were now appearing as single-word utterances. Indeed Katharine's MLU at 20 months during the play session was only 1.52, indicating that she was using multiword utterances much less consistently than Ashley. Apart from those verbs which occur in obvious routines, Katharine used only the verb "see" and contractions of the verb 'to be' in productive multiword utterances. Ashley, in contrast, by 20 months had control over a variety of verbs (e.g. bring, jump, go, want, take, make, fall, like, see, touch), and her earlier pivotal strategy had been abandoned for a more categorical organization. At 16 months, Katharine already had a MaxLU of 3.00, although her MLU was only 1.38. By 20 months her MaxLU had increased to 3.80, while her MLU was still relatively low, 1.52. This difference between MLU and MaxLU indicates that Katharine was still producing some routinized formulas, along with many single-word utterances.

Fifty-seven percent of Katharine's spontaneous utterances during the 20-month play session served pragmatic functions. While Katharine expressed wants, regulated the actions of others and referred to people, the majority of her pragmatic utterances (26%) were Interactive. However, within the category of mathetic functions, Katherine used an equal number of utterances to Name or refer to objects (27%). This is a less advanced function than Commenting, which Ashley was emphasizing at 20 months. Katharine appears to be using language predominantly for pragmatic purposes, however, she seems to have progressed beyond the point of focussing on that function alone. Katharine appears to have reached a stage at which her earlier reliance on routines has given way to a more productive use of language,

which requires a more extensive vocabulary of nouns. Katharine demonstrates a stage beyond Brady's 20-month development, and indicates that the expressive route to language is a viable alternative. Katharine's 20-month noun combinations are similar to Ashley's earlier pivotal constructions, but Katharine has arrived at this stage by a totally different route. While Brady has not quite reached the same point, he has begun to insert nouns into his formulae. Neither child has had to abandon the earlier strategy and start over from the one-word stage. Clearly the expressive route to language is not a "dead-end" as has been implied by some other researchers.

Katharine may have been able to progress to this point because her mother was well-matched in her own orientation to language, and very accepting of even Katharine's unintelligible utterances. For example, during the 18-month play session, after Katharine produced several long, incomprehensible strings, her mother responded:

Child	Mother
	Is that so?/
(Disabotawo)/	
	Really?/
	Hm/
	I don't know about that/
//Oh]/	I guess //(.)] I guess if you say so/
	I guess if you say so that's true/

Christopher (row 2, column 1)

Christopher and his mother represent the most interesting mother-child pattern of the four possible combinations. While Ashley and her mother provide an example of a matched referential dyad, Katharine and her mother demonstrate the expressive counterparts. Brady's expressive tendencies were not matched to his mother's initial emphasis, but she quickly changed and became more aligned with his interests and style. Christopher represents a rather rare phenomenon: a noun-using child with a person-referencing mother. There were only two examples of this combination in the total sample, but the incidence in the overall population is probably much lower, perhaps 1 in 75 children. In both cases, while the mothers were not noun emphasizers, they provided more than the average number of nominals. At 13 months, Christopher's mother produced 406 nominals, over 100 more than any of the other three mothers discussed. Only 27% of those were nouns (110), and only 17% were object nouns (71). His mother was evenly divided between object and person references, providing 38% of each. Abstract nouns and pronouns constituted the remaining 24% of her nominals. While she provided only 71 object nouns, Christopher was exposed to 132 person pronouns (33%). Descriptions accounted for 24% (74) of her 310 utterances, representing the single largest functional category, followed by requests for information, which accounted for 14%.

At 13 months, Christopher had a productive vocabulary of 23 words according to his mother's report. Common nouns comprised 70% of his vocabulary. Christopher could produce the names for some toys (e.g. ball, car, book), foods (e.g.

cookie, egg), items of clothing (hat, boots) and was able to name some animals (bird, bow-wow, cat). The remaining 30% of his productive vocabulary was composed of four non-nouns and three proper nouns. He comprehended 64 words: 33 non-nouns, 27 common nouns and 4 proper nouns. His spontaneous noun-to-total-words ratio during the 13-month play session was 52%. With an MLU of 1.14 and a MaxLU of 1.60, Christopher was predominantly in a single-word stage.

At 13 months, during the play session, Christopher produced three multiword utterances: "A ball", "A car" and "I did". From the 13-month session to the end of the study, Christopher relied heavily upon the "A" plus X construction, where X represents some noun. As a result, his noun emphasis was masked. By 16 months he produced 112 multiword utterances during the 45 minutes of taping, and had an MLU of 1.74, and a MaxLU of 2.40. However, his utterances were very repetitive, both across and within contexts, and he actually produced only 19 different ones. For example, "A car" appeared 25 times during the play session, 4 times during feeding and 3 times during the idiosyncratic session. Eighty-five of those utterances (76%) followed the "A" plus "X" format and included common nouns such as "car", "doggie", "ball", "cat", "bird", "book" and "cookie". Christopher also produced, "A Daddy", and by 18 months he had enlarged the range of this format, which now accounted for 82% (106) of all his multiword utterances. Along with many more common nouns (e.g. camera, picture, pillow, mouse, bee, deer and clown), which were used appropriately, Christopher tried to fit other words into the format. As a result he produced, "A throw" and "A burp", but also phrases like, "A Tommy", "A

butter", "A more" and "A dat?" There had been no change in Christopher's MLU by 18 months: His MLU was 1.69 and his MaxLU was still 2.40. He had not progressed beyond the two-word stage, and was not inflating his MaxLU with long routinized phrases.

By 20 months, Christopher was still using the same formula, but now it accounted for only 23% of his 117 multiword utterances. He was also producing a variant of this formula, by including an adjective. For example, Christopher said, "A poor boy", "A little boy", "A toy top", "A toy train", "A white truck" and "A car door". Although his noun-to-total-word ratio was only 37% during the play session, 86% of all his multiword utterances contained at least one noun. Christopher fell within the criterion for an expressive child, however, he did not fit the traditional description of an expressive child. He was not a pronoun user. At 20 months, during the play session for example, his noun to nominals ratio was 87%. Also Christopher did not start out using formulae containing many pronouns. At 16 months he produced, "What dat?" and "Whurdit go?" (Where did it go?), but they represented only 13% of his multiword utterances. More interestingly, both phrases were not social in orientation but object-oriented. By 18 months, "What dat?" had been converted to "A dat?", and it accounted for 21% of his 18-month multiword utterances. Moreover, the gradual increase in Christopher's MaxLU indicates that he passed from a single-word stage to a two-word stage, unlike both Brady and Katharine.

At 20 months, Christopher's MLU had increased to 2.10, and his MaxLU was

now 4.40. Like Ashley, Christopher had progressed beyond the optimal stage for identifying individual differences. His 18-month noun-to-total-word ratio of 35% placed him within the category of expressive children, however, pronouns accounted for only 10% of his total production. Christopher at 20 months was producing a variety of multiword utterances. His use of language had become less redundant, with 91 different exemplars from a corpus of 117 utterances. Like Ashley, Christopher began to use the plural "s" productively, producing, "little boys", "And toy cups", "No do blocks" and "On the tops". He also overgeneralized the rule to a plural mass noun and produced, "A peoples", and referred to a pile of blocks that were unevenly stacked as, "A triangles!".

Christopher had been expressing existence (with his "A X" formula) since 13 months. At 16 months he added negation, commenting, "No car" for example, while looking out of the window with his mother. Recurrence occurred at 18 months with "More cup", "A more cup", "A more" and "Want more", as Christopher tried to persuade his mother to give him more water during the food session. By 18 months Christopher had also started to express action events with multiword utterances ("I phone Daddy", "I do" and "I do dat"), but he produced more state utterances ("Want dat", "Want June", "Want more", "I want down" and "want down"). By 20 months he was producing a variety of both types, although his ability to express state events seemed more extensive. Encoding of action events included, "Goin to call Daddy", "Car going", "And go cat", and "Take boy ride", as he pushed the bus. However, state events included locative states, such as "Little boys up", "A hair in",

and "A boy here", as well as state utterances such as "A boy with a hat", "I got a car", "I like the door", "I got hair" (when his mother commented that the doll had none) and several expressions beginning with "I want". Christopher appears to have made the transition to productive speech despite adopting an early strategy which relied on a single pivotal construction.

An examination of the functions expressed by Christopher's utterances during the 20-month play session supports the contention that Christopher is not a typical expressive child. Out of 93 intelligible, spontaneous utterances, 84% expressed mathetic functions. The largest category was Naming (51%) and Commenting accounted for another 30%. None of his utterances was purely Interactive in function. One other strategy of Christopher's should be mentioned: He was clearly an imitator. Initially he seemed to repeat the end of his mother's utterance. During the 18 month play session for example, when his mother asked him, "Is that a bunny?", he replied, "A bunny". Later, when thay were discussing a book, he repeated several of her endings (e.g. "Another mouse" after his mother says, "And here's another mouse"). By 20 months Christopher was incorporating immediate imitations into his own utterances. For example, after his mother had commented that Christopher liked the car door closed, she asked, "How come?", to which Christopher responded, "How come no door?". When he rejected his food saying, "No", she asked, "Are you sure?" and he replied, "No sure", shaking his head.

Christopher's mother frequently adopted a very playful attitude, and often made humorous comments which were clearly beyond Christopher's comprehension.

For example, at 13 months she commented,("I don't think she's too clever, that one over there"), when the experimenter tried to avoid being drawn into the action by the child. Later she attempted to get him to use the telephone saying, "It's for you", "D'you wanna take this call?", "Shall I say you're in conference?". While looking at a picture book showing a beach, she commented, "This is very apropos", "The Daddy is sleeping while the Mommy plays with the child". During the feeding session when Christopher removed food from his mouth, she said "No wonder I don't eat with you", "A person could lose their appetite". In response to Christopher's pointing and labelling her "A Mamma" repeatedly, she adopted a dramatic pose and said, "The woman of the hour, Momma!". As a result some of her utterances were difficult to transcribe and code, since she did not limit herself to talking about 'the here and now'. For example, at 13 months she offered Christopher the phone, saying, "Let's call Australia". However, many of her utterances were closely matched to his, and they often shared a focus of interest.

She continued to provide many more nominals than the other mothers. At 16 and 18 months she produced 509 and 596, respectively, during the free-play sessions. Her object to person referencing during those sessions was still balanced, and object nouns accounted for only 19% and 18%, respectively. Descriptions were no longer the main category, accounting for only 17% of her utterances at both sessions, while requests for action at 16 months (24%), and conversational devices at 18 months (25%), represented the largest categories. However, by 20 months a change had occurred. She had reduced her total nominals to 336, and while pronouns still

predominated (61%), objects now accounted for 46% of her nominals, compared with 38% person references. Object nouns (87) were still fewer than person pronouns (106), but they accounted for 26% of her nominals. Similarly, descriptions once again represented the main category (20%), followed by conversational devices (17%). These are hardly profound changes, but it is interesting that they occurred at this time, when Christopher himself had finally made the transition to productive speech.

Despite being categorized as an expressive child on the basis of his noun-to-total-word ratio, Christopher did not exemplify the normal characteristics associated with the expressive style. He never relied upon routinized social phrases and his low noun ratio appears to be an artifact of having adopted a limited pivotal strategy. By 20 months he had abandoned that strategy and was elaborating noun phrases. His constructions at 20 months appear to be more categorical than pivotal, including some subject-verb-object constructions, although he had not progressed beyond using "I" for the subject in such constructions. His use of language to express mathetic functions supports the contention that he was not a typical expressive child. The qualitative analysis of Christopher's development from single-word to multiword utterances has demonstrated that quantitative results can be misleading.

Table 26 summarizes the similarities and differences between the four children described in the individual profiles. Their 13-month reported and observed measures are presented, along with 20-month measures, including functions. Maternal language measures for the four mothers based on their 13-month play transcripts, are presented in Table 27.

Table 26
Comparison of 13-month and 20-month Language Measures
for Individual Children.

	13-month			
Reported Production:	A	B	K	C
Total Size of Vocabulary	30	31	20	23
% Common nouns	70%	45%	25%	70%
Comprehension:				
Total Size of Vocabulary	53	50	71	64
% Common nouns	43%	46%	39%	42%
% Non-nouns	42%	44%	52%	52%
Observed				
% Common nouns	74%	7%	21%	52%
	20-month			
% Common nouns	81%†	9%	46%	87%†
MLU	2.75	1.60	1.52	2.10
MaxLU	5.20	3.90	3.80	4.40
Functions				
Naming	18%	12%	27%	51%
Commenting	64%	7%	3%	30%
Interactive	1%	32%	26%	0%

† Percent of common nouns in total nominals

Table 27
Comparison of Maternal 13-month References and Functions for Individual Children.

	13-month			
	A	B	K	C
# Nominals	286	250	282	406
% Nouns	57%	39%	33%	27%
% Objects	72%	56%	40%	38%
% Person	21%	30%	44%	38%
% Object noun	52%	32%	22%	17%
% Person pronoun	16%	24%	36%	33%
% Descriptions	36%	19%	18%	24%
% Req. for Action	12%	17%	22%	11%
% Convers. Devices	5%	13%	18%	9%

III.17 Comparison in a Book-Reading Situation

Finally, all four children will be compared in the same type of activity, reading books, in order to illustrate that these dyads engage in different types of interaction. At both the 16-month and 18-month visits, each dyad was videotaped engaging in activities of their choice. All four mothers spent part of those sessions reading to their children. However, there were many differences between mothers in terms of their choice of books and style of interaction, and the children also reacted in different ways.

At 16 months Ashley and her mother spent approximately nine minutes of the 15-minute session engaged in reading and talking about the pictures in her books. Her mother asked Ashley the typical questions (e.g. "What's that?"), and engaged in

the types of routines that Ninio and Bruner (1978) have discussed. After asking Ashley to provide information, she repeated, expanded and evaluated Ashley's answer, or provided the label if Ashley had been unable to do so. In some instances she made connections to relevant real life experiences. She also provided descriptions and frequently repeated the label, as in, "And this is a bridge", "Bridge". A brief sample of their transcript will illustrate this type of interaction:

Child		Mother	
Act	Vocalization	Act	Vocalization
(Ashley is sitting on her mother's lap with the book in front; mother turns page)			
			There's the bear/
		Turns	Bear/
Points	And cookie/		
	Cookie/		
		Points	What's that?/
	And bloop/		
			Yes, and bloop/
		Points	Blueberries/
			And what are these?/
		Points	Four blueberries/
			D'you see that?/
	And cookie/		

Cookies/

Yes/

Those are cookies/

That's right/

Those are cookies/

During their 16 and 18-month sessions Brady and his mother also spent time with books. At 16 months Brady's mother read the story to Brady without pausing to ask any questions. She produced 62 consecutive utterances, during which Brady was focused on the book. After a brief pause, during which they decided which book would be read next, Brady's mother continued with a book called "Horns to Toes". On each page she pointed to the body part being shown, provided the label (Horns, eyes, ears, eyebrows etc.), and frequently pointed to Brady's. Brady was focused on the activity, squealed in delight when his bellybutton was pressed, and produced his only comment, "There". At 18 months, they again went through the same routine with this book. Again, Brady seemed involved, pointing to himself at some points, smiling when his mother did so. However, he made no attempt to repeat any of the forty-four nouns his mother produced. Instead, when she reached the last page, revealing the whole creature, and said, "Everything!", Brady hit the page and exclaimed, "Everything!".

Brady's mother attempted to engage him in the normal routines for reading books. During each of the play sessions a book was provided. In order to prevent

mothers from simply reading the books, all words had been obliterated. At 13 months Brady offered the book to his mother, who then proceeded to ask questions (What's that?) and to provide descriptions. Brady did not participate at all, despite the fact that she told him that he knew some of the objects she was labelling. After less than a minute, Brady started to play with something else and his mother abandoned the book. At 16 months she tried to interest him in the book, but Brady started to play with the telephone and they never progressed beyond drawing his attention to the book. An equally brief episode occurred at the 18-month session, when his mother managed to draw his attention to a picture and asked, "What's that?". Brady gave an incomprehensible reply, and his mother provided the label, "That's a bird", but after another similar exchange Brady walked off and the book was forgotten. At 20 months Brady picked the book out of the box and started to look at it by himself. His mother asked to see it, but they were soon absorbed in a teaparty and the book was not mentioned again. It is possible that Brady's mother did not pursue this type of routine because Brady demonstrated little interest, or that she normally simply read books to Brady, and therefore he had less interest in this questioning game. It is possible that expressive children may not engage in the 'book-reading' format with their mothers, since reference is not their forte.

Katharine and her mother seem to support this conclusion. At 16 months, when Katharine opened her book, her mother asked, "Will you read to me", which is rather an unconventional opening. She persisted in asking Katharine to read, and then proceeded to read her several nursery rhymes from Mother Goose. There were no

questions or descriptions, and Katharine listened without interrupting. At one point her mother asked her, "Can you say 'Bow-wow-wow'" and Katharine obliged. After a couple of minutes Katharine pushed the book away, got up, said, "Bye" and walked off. The rhythm of nursery rhymes may be attractive, particularly for expressive children. However, listening to rhymes like, "Three wise men of Gotham went to sea in a boat. If the boat had been stronger, my song had been longer", does not seem to provide the optimal circumstances for identifying reference. A few seconds later they resumed reading from another rhyming book. Katharine herself identified a dog and her mother said, "Yes, ma'm, that's a doggie". Katharine offered her mother some ripped pages from the book, and her mother then proceeded to playfully castigate her, all the time talking as if she was not present:

Child		Mother
Act	Vocalization	Vocalization
(mother is holding a page torn from book)		
		I have to glue them back in/
		Because KATHARINE/
		You know that little kid Katharine/
		Tore 'em out/
(same intonation)/		
		Hm-mm/
nods	//Yeah]/	//Yes]/

		Katharine/
		You know her/
		She did it/
	(shor)/	
		It wasn't very nice of her/
		Was it?/
nods	(bedir)/	
		YOU wouldn't do a thing like that/
	(shestepon)/	
		I KNOW/
		I heard what you/
		What kid would take a pretty book like this and tear the pages out/

Both mother and child talked in the same slow, ruminating style at this point and Katharine imitated her mother's intonation. Katharine tried to distract her mother, saying, "another book", and in a few minutes they resumed reading the rhyming book. This episode demonstrates how an expressive dyad can convert a proto-typical referential activity, reading books, into a person-oriented dramatic episode.

At 13 months during the play session, when Katharine's mother opened the book provided, she asked, "Where are the words?", indicating that her normal mode

is to read to the child. At 16 months, when Katharine and she looked at the book, she repeatedly asked Katharine to read to her. When Katharine responded, "Mommie do it", she ignored that request, saying, "I wish you'd read me that pretty new book". Katharine proceeded to talk into the telephone and the book was ignored. At 18 months she did attempt to question Katharine and elicit naming activity but Katharine was uncooperative. However, by the 20-month visit Katharine and her mother settled down to several minutes of typical book-reading. Katharine's mother asked several "What's that?" questions, and Katharine answered some. She also repeated the label if her mother provided it, even asked, "Whats'em?", and, while pointing to the book, instructed her mother to "see" the items she named. It should be remembered that by 20 months Katharine appears to have had an explosion of nouns in her productive vocabulary. Perhaps mothers engage in these formats only when their child is ready.

Christopher and his mother performed routine questioning and answering while looking at books for approximately 8 minutes during their 16-month session and for the entire 18-month idiosyncratic episode. It was clear that this was an activity that they frequently engaged in, and that Christopher was familiar with the books, since he started naming items that appeared on later pages and searched for them. Christopher's mother also provided many comments, comparing the depicted activities with Christopher's own experiences. For example, at 16 months,

Child		Mother	
Act	Vocalization	Act	Vocalization
			And here they are at Grandma and Grandpa's house/
			Does that look like Poppop?/
	(A Boh)		
			Yeah/
Points	A bird/		
			Yeah/
			That's a little butterfly/
			I don't think you've ever seen one of those/
		Points	And there they are/
			It's the little boy and girl with their doggie at Grandma and Grandpa's house/
			Does that look like Grandma?/
			I don't think so/
			Grandma would be upset at that/
			She doesn't have grey hair/
Turns page	Mama/		
	//Oh!]/		That //looks] like Poppop though/
			Doesn't it?/

A ball/

A ball/

Yeah/

As this episode shows, Christopher's mother tended to weave a story around the pictures she discussed, and while she asked some typical "What's that?" questions (7 at 16 months, and 23 at 18 months), she did not limit herself to such formats. At both sessions she also simply read some books to Christopher, although (unlike Katharine's mother) her reading was punctuated with comments and questions. By 18 months Christopher had started to take a more active role. While he answered only 4 of his mother's 23 questions, he now exchanged roles with her, and asked her 18 "A dat?" questions. Although he did not answer her questions, he repeated many of the labels she provided, and independently pointed to and named objects and animals.

The mothers of Christopher and Ashley seem to approach the task of reading books in a manner that fits the formats described by Ninio and Bruner. Christopher's mother elaborated and personalised the discussion more than Ashley's mother, who tended to focus on the objects. However, reading books seems to constitute an entirely different kind of activity for the mothers of Brady and Katharine. It is possible that this is an activity which provides a clear demonstration of the existence of individual differences for both partners of the dyad.

III.18 Summary of Results

Before proceeding to discuss the significance and implications of these results, a brief summary is in order. At 13 months children's stylistic tendencies were found to be consistent between production and comprehension. Early stylistic preferences were not significantly related to maternal referencing variables and the only functional measure which was significantly and negatively related was conversational devices. However, 66% of the variance between children was still unaccounted for after maternal conversational devices were taken into account. Stylistic variation at 13 months is therefore relatively independent of concurrent maternal measures.

However, there were significant concurrent 13 month relations between maternal language measures and the size of the child's vocabulary. Linguistic advancement at 13 months, measured by the size of the child's vocabulary, was related to maternal object referencing, noun usage, particularly object nouns, use of descriptions and repetition of children's nouns. Late talkers, in addition, received more commands and conversational devices.

The referential and expressive styles evidenced at 20 months are significantly related to both prior maternal and child measures. An early emphasis on nouns or non-nouns predicted 20-month style. Similarly, maternal noun usage and provision of descriptions at 13 months was positively associated with the referential style, while maternal performatives and conversational devices were negatively related. However, interactions between 13-month maternal and child variables were better predictors of

20-month style than either measure alone. Even for the group of late talkers, whose early tendency had to be assessed from comprehension alone, an interaction model provided the best fit to the data.

Moreover, an interaction between child and maternal 13-month variables was also the best predictor of measures of maternal language at 20 months. Mothers and children are better predictors of each other at 20 months, but that is the result of bi-directional effects.

The present study indicates that children were relatively stable in terms of their stylistic preferences between 13 and 20 months. In addition, there was stability across contexts. These results imply that individual differences are a stable phenomenon over time and across situations and lend support for the argument that stylistic differences represent different strategies. The qualitative analyses support this conclusion. Referential and expressive children appear to follow different routes from their first few words at 13 months to the end of the study. The referential child follows the traditional route from single-words to multiword utterances. However, the expressive child has to segment stereotypical phrases into their component parts. Both children have to use analysis, but they seem to apply it at different points. Also, there appears to be a relationship between form and function at 20 months, with referential children emphasizing mathetic functions, and expressive children using pragmatic ones. Again, this result implies that stylistic differences indicate different strategies. In addition the qualitative analyses reveal that the expressive strategy can be a viable alternative route to productive language.

Context effects were also found for both maternal references and functions, although functions were more susceptible to such effects. Object references were found to be unstable over time and across contexts. During the play session mothers were more likely to use object references, descriptions, requests for information, and requests for action. Requests for permission and conversational devices occurred more frequently during the meal session.

However, when the group of early talkers was compared with the group of late talkers, it was found that the advanced children consistently received different maternal input. They were exposed to more nouns, object nouns, descriptions and repetitions of their nouns than late talkers, even in the food context. Early talkers during caretaking sessions, on the average, were actually receiving more noun and object noun references than late talkers received during their play sessions. Moreover, maternal noun usage during the 13-month meal session was actually a better predictor of stylistic variation at 20 months than the same measure from the play session.

Finally, and perhaps most importantly, maternal input had a differential effect depending on the strategy adopted by the child. When the total sample was divided into an 'expressive' group and a 'referential' group on the basis of 20-month noun usage, it was found that there were many more relations between 13-month maternal language measures and linguistic advancement for the children within the referential group. These findings imply that inconsistency in motherese findings may be attributable to a failure to take individual differences into account.

CHAPTER IV

DISCUSSION

The present study of 45 children is the single largest study of individual differences in language acquisition. The size of the sample is important, because it is only when the sample is relatively large that it is possible to feel confident that the sample includes children who epitomize the two extremes of the continuum. Most studies of early language development, because of the time-consuming nature of data reduction and analysis, are restricted to 12 or 18 children. The total sample is then usually divided in two, based on some midpoint, and those above and below the criterion are considered referential and expressive, respectively. While this practice is perfectly understandable, it necessarily results in many children being included in each group who are actually not representative of either style. An alternative strategy of selecting the most extreme cases necessarily results in basing results on an extremely small sample.

Perhaps more importantly, it is only with a sufficiently large sample that it is possible to isolate and separately analyze those children whose language development is advanced from those who are proceeding at a slower rate. Unless such steps are taken, relations between variables will inevitably be masked, since the subject pool will include the proverbial 'apples and pears'. It is particularly important

to make such distinctions when the study is trying to assess maternal effects which may differ depending upon the child's stage of language development, as Furrow, Nelson and Benedict (1979) have shown.

IV.1 Precursors of the referential and expressive styles

The present study is significant in that it attempted not only to document the existence of individual differences but also to examine potential precursors, in both mother and child. The study was designed to test several hypotheses regarding precursors of the referential and expressive styles of language acquisition. The major goal of the study was to determine whether the child's 13-month stylistic tendencies, or maternal language variables at that age, or an interaction between the two, would be the best predictor of the child's 20-month style of language acquisition. The main hypothesis of the study has been supported. Neither maternal language alone, nor child tendencies alone can account for 20-month style to the same extent as an interaction between maternal and child variables. For the group of early talkers, an interaction between percentage of nouns used by mother and child at 13 months accounts for 41% of the variance in 20-month style. Similarly, the interaction between child's 13-month percentage of common nouns and maternal percentage of descriptions accounts for 54% of the variance in the outcome measure. Both regressions are improved by the addition of maternal percent of performatives, which is negatively related to the referential style. The addition of maternal percent of performatives to each model increases the amount of variance explained to 59% and

66%, respectively.

Even for the group of later talkers, (those with vocabularies of seven words or less at 13 months), individual differences at 20-months are predicted best by an interaction model. In this case maternal variables interact with the child's earlier emphasis on common nouns in comprehension. Again, an interaction between maternal percentage of nouns at 13 months and percentage of common nouns comprehended by the child at that age accounts for 35% of the variance in 20-month style. For the late talkers, maternal percentage of object nouns is particularly important. Combined with percentage of common nouns comprehended by the child, the interaction variable accounts for 41% of the variance.

However, maternal object referencing was also important for the group of early talkers: Object-referencing mothers are more likely to have children who are early talkers. Putting the two sets of results together, it appears that an object-referencing mother tends to have a child who breaks into the language system early. If the mother uses a large percentage of nouns and provides descriptions, and the child adopts a noun-using strategy, the child will tend to be referential. If the child is a late talker, perhaps because of a more cautious approach to language as many researchers have suggested, the mother's emphasis on objects may have more impact, also producing a child with the referential style. However, some children who are early talkers, have expressive tendencies and adopt their own strategy despite having an object-referencing mother. Such an expressive strategy, combined with maternal emphasis on performatives and use of conversational devices, results in an expressive

child. Object-referencing on the part of the mother appears to be a necessary but not a sufficient condition to produce a referential child. However, the converse is not true. Mothers who do not emphasize objects tend to have children whose language development is slower, and among the group of late talkers there is an association between maternal person-referencing and the expressive style. The same association appears to hold even for early talkers, since no referential child appears amongst the group of person-referencing mothers.

However, the qualitative analysis of Christopher's language development over the seven months of the study, summarized in the previous chapter, calls for a reappraisal of that conclusion. Children like Christopher, who appear to have referential tendencies in their earliest approach to language may not develop into a 'full-blown' example of the referential style, like Ashley (see chapter 3), unless their mother emphasizes objects. However, Christopher is clearly not a typical expressive child either, since he never relies upon unanalysed formulae nor does he use pronouns. Also, like Ashley, he emphasizes mathetic functions and passes through one-word and two-word stages to multiword utterances. Christopher meets one criterion for an expressive child, his noun-to-total-word ratio; however, it is evident that he is not a typical example. He perhaps demonstrates most clearly how the child's 20-month style reflects maternal input in interaction with the child's own tendencies.

IV. 2 Maternal measures

Based on previous research findings, the present study dichotomized mothers

according to their relative emphasis on objects or persons at 13 months. However, this variable turned out to be less important than maternal noun-emphasis. This finding partially replicates studies by Klein (1980) and Longtin (1984), who had also found maternal noun usage to be associated with referential style in the child. However, Klein (1980) had also found very large differences in object referencing between the mothers of the five most referential and the five most expressive children in her study. Klein's category of object references is actually not directly comparable to the object versus person referencing utilized in the present study, because Klein defined her category to include references to both objects and persons in the child's immediate environment. Her result is therefore more consistent with the present finding that at 20 months, expressive children are exposed to both fewer object and fewer person references. It also lends support to the present finding that referential style is negatively associated with maternal use of performatives and conversational devices during a play session. Neither function makes a reference to an object or person in the child's environment.

Furrow and Nelson (1984) failed to replicate Klein's (1980) and Longtin's (1984) findings that referential and expressive children were matched to their mothers in terms of noun and pronoun preference. Instead, they found that, when the children had low MLU levels, the mothers of expressive children emphasized persons and objects equally, while referential children had object-referencing mothers. In an attempt to extend their result to an earlier stage, the present study divided mothers on the basis of their preference for object references versus person references, to

explore the significance of maternal referencing as a precursor variable. However, no linear relation between maternal 13-month object referencing and 20-month individual differences was found. It is possible that this discrepancy can be explained by examining the differences between the two studies. The analyses in Furrow and Nelson's (1984) study were based on samples of maternal speech to their children when they were at least 2 years old, with low MLU defined as 1.5 - 2.0. The children had been classified as referential or expressive on the basis of diary reports of their first 50 words. The average age for such classification was 19.6 months, and all 18 children had been classified by 24 months, the time at which maternal language was sampled. It is possible that mothers in the Furrow and Nelson study had changed their referencing and had become aligned to their children by the time their language was sampled. This suggestion is supported by the fact that in the current study, maternal object referencing was not stable across the time-span of the study.

Similarly, Dellacorte, Benedict and Klein (1983) failed to find that referential and expressive dyads were matched in their preference for nouns and pronouns. Dellacorte et al.'s suggestion that this result might be attributable to the lack of variation in the caretaking contexts that they studied, does not seem to be supported by the present study. In fact, maternal noun usage from the 13-month food session was a better predictor of referential style at 20 months for early talkers than the same variable from the play session. Perhaps Dellacorte et al.'s results may be attributed to the fact that their analyses were based on an extremely small sample of only 50 maternal utterances per child.

IV.3 Child measures

The results of the current study indicate that maternal variables interact with 13-month child variables. It is also claimed that those 13-month child variables are relatively independent of maternal language variables and, therefore, represent child influence. This claim is made on the basis of the fact that for the group of early talkers there are no relations between maternal 13-month language variables and 13-month stylistic tendencies, apart from a negative association between conversational devices and percentage of common nouns in the child's 13-month vocabulary. Sixty-six percent of the variance between early talkers at 13 months is not accounted for after percent of maternal conversational devices has been taken into account.

Similarly, for the late talkers, no significant associations were found between maternal 13-month language measures and the child's receptive language. However, percent of common nouns comprehended at 13 months was significantly related to referential style at 20 months for this group. Therefore, even children from the group of late talkers made an independent contribution to the 20-month outcome measure.

It must be noted, however, that the child's language tendencies are being assessed at 13 months, by which time an interactional history has already been established for the dyad. Moreover, there are many other measures of maternal behavior which have not been assessed and which could have had an effect upon the child's 13-month tendencies. The child obviously has not developed within a vacuum, but is embedded within an interactional system. The claim that the child makes an independent contribution, which interacts with maternal language variables, simply

means that maternal language input alone cannot account for the pre-existing differences between children at the start of the study. This claim is bolstered by the fact that it was possible to find children for each cell of the design. Mothers with relatively similar 13-month language profiles had children who were strikingly different. However, no claim is being made to account for those pre-existing differences. The child's 13-month state is the result of a history of interaction, but it is also a description of the child at that point in time.

It is believed that differences between children reflect differences in their functional approach to language, but they may also have implications for their cognitive development as well. Reznick and Smedley (1987) have recently found that individual differences in sorting, which they conceptualise as a cognitive style, are related to differences in nominal reference for infants at this age.

IV.4 Bi-directional effects

Just as the child is a product of an interactional history, it is also clear from the present study that by the time the child is 20 months old, the child has had an influence upon the mother. Mothers and children were more alike at 20 months than they had been at 13 months. However, this is not simply the result of maternal effects upon the child. Child 13-month variables or 13-month interaction variables are better predictors of those maternal 20-month variables which are related to stylistic variation in the child at 20 months, than the matched 13-month maternal variable. This result implies that mothers change over the 7-month course of the study, and

that child factors play a role in that change.

In attempting to uncover the direction of control, the present study has demonstrated interactional effects for both maternal and child outcome measures at 20 months. Bi-directionality can indeed pose a problem for the interpretation of correlational results if one is attempting to assess the facilitative effect of maternal variables for a single point in time. For example, mothers of late talkers may reduce the complexity of their utterances, with the result that a positive association may emerge between maternal language complexity and rate of progress for the child. However, in the present longitudinal study the children's stylistic tendencies for the group of early talkers were remarkably independent of measures of the mothers' language at the start of the study. Therefore, the bi-directionality demonstrated in this study is not a confound but a finding. Each dyad is a functioning system, with each member of the dyad exerting an influence upon his or her partner.

IV.5 Comparison with Bates, Bretherton and Snyder's (1988) study

Before proceeding to discuss the implications of these findings it is important to compare the current results with Bates, Bretherton and Snyder's (1988) results of a longitudinal study of individual differences, which also entailed a large pool of 32 subjects. Bates et al. set out to examine individual differences in early language development in an attempt to identify biological substrates of language, or vertical language modules of the type Fodor (1983) discusses. Their analyses of what they term different strands or modules, used psychometric techniques. In so doing, they

focused on those characteristics which defined the precocious children at each age. As a result they never reveal how many of the children in their study would be characterized as referential or expressive at 20 months. The two studies, therefore, are difficult to compare.

Despite many similarities in the results, one difference between the two studies lies in the relationship between language comprehension and production at 13-months. Where Bates et al. found a dissociation between comprehension and production, the present study found consistency across those modalities both in size of vocabulary and style. This inconsistency can be explained in terms of the difference between the two pools of subjects. Approximately one-third of Bates et al.'s pool of subjects had receptive vocabularies of over 50 words, compared with two-thirds of the present sample. It is expected that as children's vocabularies increase in size, percentage scores will be more reliable indicators of stylistic preference. Therefore, while these results agree with Bates et al.'s finding that children who have productive vocabularies emphasizing nouns tend to have larger vocabularies, they also show that the same association holds within comprehension, and consistency is found across the two modalities. Bates et al. found referential style to be characteristic of precocious development in both modalities but not co-existing within the same children. The present sample, with a larger number of somewhat more advanced children found that productive noun-emphasis is related to noun-emphasis within comprehension. This result is further supported by the present finding that, even for the group of late talkers, there was consistency between 13-month comprehension and 20-month style.

Since Bates et al.'s analyses of the data are extremely complex, it is difficult to estimate what effect the discrepancy between the two findings would make for their conclusions. However, it does appear to contradict their conclusion that there is "a remarkable degree of dissociability between receptive and expressive vocabularies" (p. 78) at 13 months. If that conclusion is not supported, their characterization of the first strand of their two strand approach, and later three strand approach, is also called into question. Bates et al. conclude that 'the first strand' of their model is "analysed production", on the grounds that flexible object naming unites comprehension and production at 13 months. This result is also found in the present study, but it should be noted that total production is as good a predictor of referential style in comprehension as flexible object naming at 13 months, and, therefore, there is no need to posit dissociable strands.

The present study does find consistent stylistic differences for the group of 18 early talkers at 13 months. Both according to observation and mothers' reports, some children emphasize nouns while others avoid them. However, reported productive vocabulary size and flexible use of language are not related to either style for this group. It is possible to reconcile these findings with those of Bates et al.'s study. If the sample is large, containing children of widely differing abilities, those children who are using language flexibly will tend to be noun-users in both production and comprehension, and to have larger productive and receptive vocabularies. Since there is a tendency for late talkers to be expressive, an association will be found in such a large sample, between vocabulary size, flexibility and referential style. However, it is

important to remember that correlations indicate the strength of an association, not an all-or-none relationship. In both studies, the percentage of common nouns in the child's productive 13-month vocabulary accounts for only approximately 26 percent of the variance in vocabulary size. It is a statistically significant association, but clearly it leaves room for some non-noun users to also have large productive vocabularies. Therefore, when the range is truncated and only early talkers are studied, it is possible to find children with both expressive and referential tendencies within that group, and no relations between style and either size of vocabulary or flexibility of language are found.

Midway through their analyses, Bates et al. appear to claim that stylistic differences are merely a result of differing rates of development. They base this conclusion on their strategy of following the 'precocious' children at each stage. Since the most advanced children are referential noun-users at 13 months, but concentrate on open-class terms at 20 months and closed-class items at 28 months, Bates et al. suggest that "lexical style reflects nothing other than rate of normal language development" (p. 160). However, on the basis of the present finding that children with expressive tendencies also appear within the group of early talkers, I am unable to agree with Bates et al.'s conclusion. It appears that they also retreat at least partially from their conclusion after analyzing verb-density patterns, and they conclude that "a two-strand theory of some kind is still needed to account for the lexical style data" (p. 165).

IV.6 Alternate routes to language acquisition

While the existence of individual differences was already well-established, the present study provides further evidence that the referential and expressive styles of language acquisition represent alternate routes to productive language. Moreover, this study is the first to demonstrate that the expressive strategy is a viable alternative, and not simply a 'dead-end' as has been suggested. Bates et al. (1988), for example, refer to children's use of rote productions as "cheating" (p. 94), and claim that "children who rely primarily on these (rote) processes gain no advantage whatsoever when grammar becomes productive" (p. 146). However, the qualitative analyses of Katharine's and Brady's development from early routinized phrases to productive multiword utterances (see chapter 3) demonstrate that children can build upon these processes. The oft-cited, but only presumed, process of analysis which expressive children must undertake in order to segment their routines, has been charted in the current study.

Of course, it should be emphasized that the importance of individual differences is not merely to characterize particular children, but rather, by focusing on extreme examples to gain insight into the processes by which all children acquire language. Presumably the alternate routes of analysis and synthesis differentially employed by expressive and referential children, normally function together. All children, including Ashley, pick up some socialized routines, enabling them to produce multi-word utterances without having productive control of the constituent words. They have been acquired through imitation, have practically no referential

meaning, and their function is primarily to maintain social contact.

Children at this age can be impressive imitators. I have personal experience of a 21-month-old child, who spoke and understood no English, yet during a short vacation learned to recite several nursery rhymes, without understanding a word of what he was saying. The child had already mastered several long epic poems in his own language, and probably applied that skill in the new context.

Imitation of formulaic utterances may provide an opportunity for comparison across utterances, segmentation, and a frame for generating novel productive utterances. Ruth Clark (1974) has described her own son's use of prepackaged routines, at a later stage of language development, when her son was almost 3 years old. Clark claims that her son juxtaposed or embedded existing unanalyzed routines, and that such strategies played a part in determining the child's linguistic rules. Moreover, she suggests that his language became creative "through the gradual analysis of the internal structure of sequences which begin as prepackaged routines" (p. 9). Clark's data indicate that Brady's and Katharine's initial strategy may be one that they will continue to rely upon.

This conclusion gains further support from Fillmore's (1979) analysis of the learning strategies of 5 to 7 year-old Spanish-speaking children learning English in an immersion setting. The children relied upon a few formulaic phrases which were eventually broken apart and recombined with other phrases. Nelson (1981) cites the Fillmore data to support her contention that the strategy employed by the child is dependent upon the functional context in which language is being acquired. She

claims that the use of a formulaic strategy may occur when the child is focused on using language in a social setting rather than learning language as a cognitive object. Certainly the functional analyses of Brady's and Katharine's 20-month utterances seem to support Nelson's conclusion. However, as Katharine demonstrates, such a strategy does not limit the child to a purely pragmatic use of language. It is possible to make the transition, and by incorporating nouns into earlier pragmatic formats, to produce mathetic utterances. Of course, in order to make that transition the child will have to move away from an exclusively expressive style.

IV.7 Distribution of styles

Before proceeding to examine the implications of the present results for models of language acquisition, a few points should be addressed. Fewer referential children were found in this study than had been expected. This result alone is significant for the light it sheds on earlier studies which focused on very few children who were considered to represent the norm. With hindsight, several researchers have realized that many studies selected children with clear articulation, who were probably referential. Given the low incidence of referential children in this study, the traditional model of language acquisition with clearly defined single-word and two-word stages may be applicable to even fewer children than thought, and is clearly not a universal process enroute to multiword speech.

Similarly, the finding that a large proportion of the subjects used an

expressive style was a surprising finding. Most summaries of individual differences tend to portray the two styles as characteristics of a very small minority of children at each end of the curve. This characterization may be more applicable to the referential than to the expressive style. At the very least, the distribution implies that more attention should be paid to the strategies by which expressive children make the transition from unanalyzed phrases to productive language, and that the expressive style should not be dismissed as lightly as it has been hitherto. Cross-cultural evidence demonstrating that a similar phenomenon occurs in such disparate languages as French, German and Japanese adds weight to this argument.

A reliance upon rote uses of language does not disappear with the emergence of productive language. All adult speakers have a stock of intact phrases which are used in appropriate situations. The routinized nature of these utterances probably becomes evident only when they are produced at inappropriate times, such as at funerals or dissertation defenses. Even productive sentences may have unanalyzed elements within them as subunits, and may partially explain the effortless nature of spontaneous utterances.

There is tantalising evidence that production of routinized phrases may play a part in syntactic development. Cromer (1988) cites studies of the language produced by children with low IQ suffering from spina bifida. According to these reports, such children produce utterances with complex syntax, although the syntax is incorrectly used. The children often incorporate adult phrases and clichés. There is also evidence (Curtiss and Yamada, 1981) that advanced syntactical skills in children

with low IQs may be attributed to advanced auditory short-term memory. Cromer notes that the 6-year-old child studied by Curtiss and Yamada was performing at the level of a two-year-old on non-linguistic tests and tests assessing the semantic component of language. However, in his spontaneous speech he was highly advanced in his use of syntactic structures. Curtiss and Yamada concluded that the child "appeared to have extracted purely syntactic and morphological constraints without the semantics which they normally encode" (cited in Cromer, 1988, p. 242). Perhaps the expressive strand of language acquisition may be implicated in the development of syntactic structures.

IV.8 Discussion of maternal work status and parity findings

One further point should be addressed: the relationship between the child's 13-month stylistic tendencies and the computed demographic variable, which attempted to assess the amount of time a mother could allocate to her child. Approximately half of the mothers had returned to at least part-time work by the time the children were 10 months-old. The comparison of functions across the situational contexts at 13-months indicated that maternal functions differed depending upon context. It is possible to argue that the displayed maternal functions during the meal session may be more representative of the normal type of interaction which a working mother, or a mother with several children can engage in with her child. Percent of descriptions, which was associated with referential style at 20 months in the play context, decreased in the meal situation, while conversational

devices, which were negatively related to referential style at 20-months (according to the play context), increased during the food session. These findings seem to indicate a potential mechanism to explain the relationship between the computed variable and 13-month stylistic tendencies.

However, it should be remembered that more performatives were also produced during the play session than the meal session, and that the relationship between performatives during the play session and referential style at 20-months was negative. Also there were no significant relationships between maternal functions during the food session and the child's 13-month stylistic tendencies. There is no a priori reason to assume that only non-working mothers of first-borns provide play interaction similar to that displayed during the play sessions. Working mothers may be particularly aware of the need for 'quality time' with their children. It should be remembered that the associations between the computed demographic variable and 13-month stylistic tendency and vocabulary size for the child, explain a very small amount of the total variance for each measure (15% and 12%, respectively). Moreover, there were no significant relations between the computed variable and 20-month style.

IV.9 Implications for a model of language acquisition

The present study clearly has implications for any model of language acquisition. It is necessary to design a model which can encompass both routes to productive language. Since children do not follow a single universal sequence it is

unlikely that a single universal explanation will fit the data. After several decades of examining maternal input, researchers appear to have abandoned that approach, disillusioned with the inconsistent findings, and the current focus of interest is the search for constraints, both at the level of word learning and at the level of syntactical development. Implicit in such a search is the notion that constraints are innate. Linguists and learnability theorists focus on adult competence and provide examples of constraints operating at the lexical and syntactical levels, and try to build a model for how children eventually arrive at an end-state which respects such constraints. Apart from the fact that there are reasons to doubt that all adult speakers do respect the same constraints (see Fillmore, Kempler, & Wang, 1979), there is something inherently unappealing about a model that posits specific innate constraints for which there is no evidence in the data for many years of early childhood. Children acquiring language do not respect the constraints posited, and at the earliest stages produce many ungrammatical utterances.

As discussed in chapter 1, individual differences seem more compatible with a language acquisition model based on distributional analysis than a parameter-setting model. A parameter-setting model will have to posit discontinuity between the early stages of language acquisition and assume that the innate device becomes operative at a later stage. A model based on cue strength can incorporate the findings of the present study, including the relationship between maternal input and stylistic emphasis of the child.

In model building, parsimony is to be preferred. Therefore, unless one is

forced to posit innate language-specific contraints, it is preferable to try to build a model without them. If language acquisition can be shown to be compatible with other learning tasks, building on similar cognitive strategies, innate language-specific constraints will be unnecessary. While the present study does not address this issue directly, (because it does not follow children to the point when they have mastered syntax), the children in this study are acquiring language and using it in pragmatic ways. If a model for the acquisition of syntax can also encompass this stage of development and account for the variability displayed, it will provide a more simple and elegant theory for language acquisition.

Individual differences pose particular problems for models relying on innate constraints, and Pinker (1987) has recently commented that "virtually all theories of language acquisition suffer here". Models attempting to show how children arrive at some presumed end-state must also be able to encompass earlier developmental stages. Otherwise they are simply a model of how a system can reach that end-state without demonstrating that the model has anything in common with how children actually do accomplish the task.

Most proponents of constraints at the level of lexical development assume that the majority of children's first words are nouns. Gentner (1982), for example, claims that nouns represent a category that is conceptually simpler and more basic than concepts referred to by verbs or prepositions. She argues that language follows some natural perceptual segmentation of the world, and that this explains why children learn nouns first. However, as Nelson (1988) has cogently argued, there is no

evidence for strong internal constraints on word learning. At most a particular bias or preference may be found, but individual differences moderate against any strong claims for constraints.

The present study provides specific evidence that when a child does emphasize object nouns, that emphasis need not be attributed to innate constraints, but rather is directly related both to frequency of nouns in the maternal input, as well as to some strategy adopted by the child. Since children adopt different strategies, there cannot be an innate universal constraint. This result is supported by recent experimental and naturalistic data. Schwartz and Terrell (1983) used an experimental paradigm to examine the role of input frequency in lexical acquisition for infants between 12 and 15 months of age. They found that the children acquired a significantly greater number of words for frequently presented exemplars. However, they also found that when infrequently presented words were acquired, distributed presentations resulted in more rapid acquisition than massed presentations. The same effects were found for object and action words, which were counterbalanced throughout the trials. Taken together, their results imply that maternal input will be most effective if mothers are consistent over time. If a mother consistently refers to the objects in the child's environment with object nouns, the child will be exposed to a large number of object names and is likely to acquire those that are mentioned more frequently. Input of this type will be more effective than focussing on a particular object at one point in time and then switching focus entirely and never mentioning it again. Distributed input allows the child processing time to consolidate

learning.

Confirming evidence for the relationship between maternal input and early word meanings comes from Harris, Barrett, Jones and Brookes' (1988) longitudinal study of four mother-child dyads observed from 6 months until the children were 2 years old. Children's first use of words were significantly related to the most frequently occurring use of those words by their mothers. While noting that relative frequency of use for a particular word is an important factor in determining the context in which the child is likely to initially produce that word, they opt for an interaction model, claiming that, "the child uses the pattern of maternal input in a variety of ways and imposes his/her structure upon it" (p. 89). Their conclusion is particularly consonant with the results of the present study.

IV.10 Implications for the status of motherese

Apart from demonstrating that maternal input plays a role in children's language acquisition, the present study is important because it has implications which go beyond individual differences. It provides crucial evidence regarding the issue of motherese. Several researchers have recently summarized the evidence for and against the effectiveness of motherese, and their conclusions have been discouraging. In the face of sometimes inconsistent results, even strong adherents of the position that maternal input plays a role in language acquisition have been forced into retreat. However, it is possible that the field has been disillusioned too easily. Nelson warned us many years ago (1981), that we ignore individual differences at our own risk.

Results from the current study indicate that unless the sample is dichotomized according to child strategy, it may be impossible to demonstrate motherese effects. Maternal input has differential effects depending on the child's strategy, and, therefore, the effectiveness of motherese may be masked.

APPENDIX C

Additional Rules for Coding 13-month Language Inventory

Words that the mother claimed had been used only on one occasion were coded as context-restricted. Also Snyder et al.'s rule that 'emotional' responses be coded as context-restricted, were overridden for those words (e.g. good, hello) where affect is the only logical response, when the child also produced the word in a clearly context-free manner. Similarly, for words such as "this" or "that" the child was credited with context-free comprehension if the child used these words in a context-free manner, regardless of whether or not the mother could provide an adequate explanation for claiming that the child's comprehension of the word was context-free. Finally, overgeneralizations were counted as context-free words if the child's use or comprehension of the word appeared to imply that the child had attached a more general meaning to the word (e.g. using 'dog' for all animals), and if the child used it in a consistent manner.

APPENDIX D

Functional Coding for Children's 20-month Utterances

A. The mathetic functions relate to learning about objects and the environment, and are used to talk about the world.

1. NAMING	Referring to or naming objects.
2. COMMENTING	Describing a property or action of an object.
3. PERSONAL	Describing ongoing or completed activity.
4. INFORMATIVE	Referring to non-present object or event.
5. REFERENTIAL INFORMATION REQUEST	Queries related to objects.

B. The pragmatic functions express the child's needs, or attempts to regulate others.

6. EXPRESSIVE	Expressing speaker's wants, needs or feelings.
7. INTERACTIVE	Establishing contact.
8. INSTRUMENTAL	Stating desire for change by another person for speaker's benefit.

9. REGULATORY	Direct attempts to regulate action of another.
10. SELF-REGULATORY	Referring to actions about to be carried out.
11. SOCIAL INFORMATION REQUESTS	Queries related to people or behavior.
12. NAMING PEOPLE	Referring to people, including in books.

C. Three additional categories were used for utterances which performed neither mathetic nor pragmatic functions.

13. LINGUISTIC ROUTINES	Including accompaniments to action. e.g. "Uh-oh", "Boom".
14. RECITING	Production of songs or rhymes.
15. UNCODABLE	Unintelligible utterances.

APPENDIX E

MLU and MaxLU

Mean Length of utterance is based on 50 spontaneous utterances, counting morphemes. Responses, imitations, and utterances which are partially or wholly incomprehensible are not counted. Songs are not included. Repetitions of words within a single utterance contour are counted as only one word. Compound words (e.g. teaparty) are counted as one morpheme unless there is evidence that the child produces one part independently (e.g. says "teapot" and "tea"), or the mother has been using a simpler version (e.g." bus" and the child produces "school-bus"). "Whassat" is counted as two morphemes.

If the child does not produce any utterances longer than one morpheme, and has less than 50 spontaneous utterances, the child's total morphemes are divided by 50, producing an MLU < 1.00. However, this rule is not followed if the child has any multi-word utterances. In that case the child's MLU is calculated by prorating.

Maximum Length of Utterance is based on the five longest utterances per transcript. When it is reported for the child at a particular age, it therefore reflects the ten longest utterances at 13 and 20 months, and the fifteen longest utterances at 16 and 18 months.

APPENDIX F

Table 28

Relations between Maternal References in Play and Food Contexts

	Number	Percent
#Nominals	.85**	
#Utterances	.79**	
Nouns	.75**	.42*
Pronouns	.82**	.42*
Objects	.75**	.27
Persons	.77**	.36*
Object nouns	.71**	.36*
Person nouns	.45*	.27
Abstract nouns	.16	.09
Object pronouns	.55**	.18
Person pronouns	.83**	.51**
Abstract pronouns	.68**	.36*

** $p < .0005$
* $p < .020$
($N = 44$)

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