A STUDY OF TWO MOTHERS' VERBAL INTERACTION
WITH THEIR LANGUAGE-DELAYED AND
NORMAL LANGUAGE-LEARNING CHILDREN

by

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ABSTRACT

This paper reports the findings of an observational study of two family groups consisting of a mother and her two young sons. In each family, the older sons aged 4-5 and 4-9, were language-delayed despite a lack of apparent intellectual or physiological deficit, and the younger sons, aged 2-6 and 2-11, appeared to be acquiring language normally.

Over a one month period, data collection took place in three free play contexts in the following order:

1. The mother interacting with her normal child.
2. The mother interacting with her language-delayed child.
3. The mother interacting with both children together.

For each family the thirty minutes of audio-taped data collected in each of the three contexts were analyzed in terms of a number of physical performance, structural, and functional parameters.

In all contexts the mothers' speech styles were characteristically differentiated from each other. Some evidence supports the hypothesis that mothers make differential assumptions about the verbal input needs of their language-delayed versus their normal language-learning children.
TABLE OF CONTENTS

ABSTRACT ii
TABLE OF CONTENTS iii
LIST OF TABLES vi
ACKNOWLEDGEMENT vii

CHAPTER

1 INTRODUCTION 1

2 LITERATURE REVIEW 5
  2.1 Code Switching 5
  2.2 The Verbal Input to Normal Children Acquiring Their First Language 8
    2.2.1 By Mothers 8
    2.2.2 By Other Adults 11
    2.2.3 By Children 13
    2.2.4 Direct versus Indirect Speech 14
  2.3 The Results of Manipulative Experiments 15
  2.4 The Verbal Input to Children Who are not Acquiring Language Normally 17

3 STATEMENT OF PROBLEM 21

4 METHOD 23
  4.1 Selection of the Subjects 23
<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.2 Procedure</td>
<td>24</td>
</tr>
<tr>
<td>4.3 Transcription of the Data</td>
<td>26</td>
</tr>
<tr>
<td>4.4 Analysis of the Data</td>
<td>27</td>
</tr>
<tr>
<td>4.4.1 The Language of the Children</td>
<td>27</td>
</tr>
<tr>
<td>4.4.2 The Language of the Mother</td>
<td>27</td>
</tr>
<tr>
<td>4.4.2.1 Physical Performance Parameters</td>
<td>27</td>
</tr>
<tr>
<td>4.4.2.2 Structural Parameters</td>
<td>29</td>
</tr>
<tr>
<td>4.4.2.3 Functional Parameters</td>
<td>30</td>
</tr>
<tr>
<td>5 RESULTS</td>
<td>31</td>
</tr>
<tr>
<td>5.1 The Language of the Child</td>
<td>31</td>
</tr>
<tr>
<td>5.2 The Language of the Mother</td>
<td>32</td>
</tr>
<tr>
<td>5.2.1 Physical Performance Parameters</td>
<td>32</td>
</tr>
<tr>
<td>5.2.2 Structural Parameters</td>
<td>34</td>
</tr>
<tr>
<td>5.2.3 Functional Parameters</td>
<td>37</td>
</tr>
<tr>
<td>6 DISCUSSION</td>
<td>40</td>
</tr>
<tr>
<td>6.1 Review of the Present Results in Relation to Theory and Previous Research</td>
<td>40</td>
</tr>
<tr>
<td>6.2 Limitations of the Present Investigation</td>
<td>43</td>
</tr>
<tr>
<td>6.2.1 Subjects</td>
<td>43</td>
</tr>
<tr>
<td>6.2.2 Procedure</td>
<td>43</td>
</tr>
<tr>
<td>6.2.3 Analysis</td>
<td>44</td>
</tr>
<tr>
<td>6.3 Implications for Theory and Future Research</td>
<td>45</td>
</tr>
<tr>
<td>6.4 Summary</td>
<td>46</td>
</tr>
</tbody>
</table>
LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Number of Utterances, MLU and Upper Bound of the Two Mothers and Their Normal and Language-Delayed Children in Three Contexts</td>
</tr>
<tr>
<td>2</td>
<td>Physical Performance Parameters of the Two Mothers' Speech to Their Normal and Language-Delayed Children</td>
</tr>
<tr>
<td>3</td>
<td>Structural Parameters of the Two Mothers' Speech in Three Contexts</td>
</tr>
<tr>
<td>4</td>
<td>Mothers' Utterances in Three Contexts Classified According to Bloom's Functional Types</td>
</tr>
<tr>
<td>5</td>
<td>Mothers' Interrogative Forms in Three Contexts Classified According to Holzman's Functional Types</td>
</tr>
</tbody>
</table>
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CHAPTER 1

INTRODUCTION

The importance of the role of the environment in which a child acquires his first language has been a controversial issue. Traditionally, two theoretical positions have upheld opposing views on the role of environmental assistance in the language acquisition process. A brief overview of the rationalist or cognitive position in contrast with the empiricist or learning position will suffice as an explanation for the emergence of the particular area of research that is the concern of the present investigation.

Rationalists such as von Humboldt, Lenneberg, and Chomsky give credence to a strong innateness hypothesis which maintains that amazingly complex but poorly described innate capabilities are the essential properties of the language acquisition device (LAD). By means of the LAD, given complex primary linguistic data, the child must construct a grammar or set of rules in order to eventually perform comparable output. It is acknowledged that input to the LAD from speakers of a specific language is necessary in order for the device to be activated; however, the quantity and quality of these primary linguistic data are not considered of importance.

On the other hand, the empiricist position emphasizes the role of the environment. Research results from a wide variety of experiments in the fields of cognition, psycholinguistics, and sociolinguistics, have revealed some of the environmental variables that affect both the rate and quality of the child's language development.

For example, McCarthy (1954) cites several studies in which the
development of institutionalized children does not proceed at the rate of children raised in families. Due to a presumably impoverished environment, language development as well as all other areas of development is often somewhat retarded. Furthermore, when more mothering is supplied, language development shows the least improvement and tends to remain permanently impaired.

In particular, the work of Bernstein has described differences in the quality of language output that is often correlated with the social class environment in which the child is raised. The working-class primarily uses a "restricted code" while the middle-class child learns to use an "elaborated code". Bernstein defines these codes in the following way:

If the speaker is oriented toward an elaborated code, then the code will facilitate the speaker in his attempts to make explicit (verbally) his intentions. If a speaker is oriented toward a restricted code, then this code will not facilitate the verbal expansion of the speaker's intent. In the case of an elaborated code the speech system requires more complex planning than in the case of a restricted code.

(Bernstein, 1970, p. 31)

Moreover, the quality of the working-class child's language places him at a disadvantage in the school system. In keeping with the empiricist position, Bernstein notes from the point of view of a sociologist:

These two codes, elaborated and restricted, are generated by a particular form of social relation. Indeed they are likely to be a realization of different social structures. They do not necessarily develop solely because of a speaker's innate ability.

(Bernstein, 1970, p. 32)

Apparently the study of environmental assistance in relation to language development is only valid if the empiricist/learning position is accepted. Cazden has thoroughly analyzed the topic of environmental
assistance, of which the subject of this investigation is a subcomponent. A brief discussion of the issues involved in the larger area of research is necessary. Throughout this paper, the working definition of environmental assistance is "influences from the external environment." (Cazden, 1972, p. 101).

From the start, Cazden states that without a detailed description of the dependent variable, child language, there is no research basis for discovering those aspects of the child's environment which affect the language acquisition process. Therefore, it is understandable that, to date, most of the research on environmental assistance is limited to assistance to the child's acquisition of syntax.

According to Cazden, environmental assistance research accomplished to date can be viewed in the following way. Researchers have investigated aspects of the child's environment that can be grouped into three general categories: (1) characteristics of the language available for the child to hear; (2) characteristics of the linguistic interactions involving the child and at least one other interlocutor; (3) characteristics of the non-linguistic environment. Also, Cazden presents an overview of the research results which categorize social factors in terms of three categories from the least certain to the most certain: (A) detection of an interesting and theoretically plausible feature of the child's environment; (B) correlations between these features and some aspect of the child's language; and (C) causal relationships tested by means of manipulative experiments.

A great deal of research has been directed specifically to the interaction between the mother and the child because "the mechanism by which the child is socialized to his language code or codes is in the communicative interaction between mother and child ... therefore ... the
mother's language style has decisive consequences for the language development of the child." (Olim, 1970, p. 221) According to Snow (1974) the purpose of the first descriptions of mothers' speech to young children was to refute the prevailing view of the 1960's that language acquisition was largely innate.

To date, the bulk of the mother-child interaction studies have been concerned with the normal child's language acquisition. Some of the insight gained from the studies of normal development has been used in designing research to investigate the case of the child who is not acquiring language normally. Sufficient research has demonstrated that the normal child's environment does affect his language development. Consequently, knowledge about the linguistically-deficient child's environment is certain to be of interest and importance to all who deal with such children. The primary concern of the present investigation is the verbal interaction between the mother and her language-delayed child.
2.1 Code Switching

Implicitly, the foregoing material acknowledges the phenomenon of code switching or stylistic variation of the individual. The literature available on this topic is extensive but, for the most part, peripheral to the considerations of this present research. Of interest here is one code: that which is used in addressing young children. To date, this particular code has been quite well described both in its own right and as the result of switching from a different code; however, the precise significance of the adjustments involved with respect to the language development of the child remains in question.

In a recent paper, Berko Gleason (1973) has analyzed the code switching by adults when addressing children as well as the code switching ability of the children themselves. Stated briefly, the language addressed to the children observed was functionally a language of socialization. Adults used a controlling language for the purpose of indicating to children between four and eight years of age what to do, what to think, and how to feel. For example, the function of the frequently exaggerated responses of adults such as, "Hey, wow, that's almost full to the top!" (Berko Gleason, 1973, p. 162) is to indicate to the child what his reaction ought to be, how he should feel. Typically, adults do not use this code in communication with each other.

Moreover, evidence of the ability to switch to a code similar in some respects to that used by adults was found in the language of children
between the ages of four and eight when they spoke to even younger children. In summary, Berko Gleason's results on the ways in which children switch codes when talking to different people are:

Four-year-olds may whine at their mothers, engage in intricate verbal play with their peers, and reserve their narrative, discursive talks for their grown-up friends. By the time they are 8, children have added to the foregoing some of the politeness routines of formal adult speech, baby-talk style, and the ability to talk to younger children in the language of socialization.

(Berko Gleason, 1973, p. 167)

Although Berko Gleason suggests the entailment of a learning process, the details of emergence of these codes in the normal language acquisition process are yet to be elaborated.

Explanations for the production of a simplified speech register remain speculative until further manipulative experimentation demonstrates unequivocally the positive effect of a simplified input on the language development process of the child. Snow (1974) has reviewed a perspective of language acquisition which maintains that the simplicity and redundancy of mother's speech are the effects of very specific adjustments for the benefit of the child and that are cued by his communicative output as much as by his attentiveness and comprehension. Other researchers, including Moerk (1972) and Nelson (1973) confirm this interactionist position on the child's first language acquisition. Sufficient detailed information is not yet available to establish in what ways a simplified speech register specifically aids the child in learning his native language. Snow (1974) states briefly that "consistent simplicity and redundancy may primarily serve the purpose of minimizing confusion and helping to consolidate gains in language acquisition." (pp. 16-17)
The rationale for the majority of measurements made on the speech input to children is that "simplicity" is demonstrated by these measurements. Some of the measurements by which simplicity can be assessed are speech rate, lexical variability, length of utterance, and incidence of utterances without verbs. That is, a comparatively slow speech rate used by adults when addressing young children as opposed to other adults and older children is assumed to facilitate the decoding process for the child. A lower type-taken ratio corresponds to lower lexical variability and is indicative of a more repetitive vocabulary which is therefore simpler to decode. Also, a lower mean length of utterance reduces the load on the child's decoding abilities in two ways. First, shorter utterances are often grammatically less complex, and, in terms of auditory memory, a shorter utterance is most likely to be decoded more easily. Snow (1972) found that utterances without verbs were often the result of an incomplete repetition of a fully grammatical utterance that had been said previously. The chief value of such repetition seems to be to give knowledge about the boundaries of units within utterances (Broen, 1972). In addition, obviously, repetitions give the child a second chance to process an utterance.

Finally, the most significant generalization that can be made about code switching to a special speech register for addressing a young child is the universality of this phenomenon. An early study that demonstrated this universality was "Baby Talk in Six Languages" by Ferguson (1964). This well-known research describes the specialized lexicon, exaggerated intonation as well as the phonological and grammatical modifications that are similar in principle across different languages, although the particular form of adjustment is usually language-specific. Furthermore, as the subsequent sections of the present review will demonstrate,
code switching to a special register when addressing young children is a characteristic of the speech of older children and all adults.

2.2 The Verbal Input to Normal Children Acquiring Their First Language

2.2.1 By Mothers

Two reviews, one by Farwell (1973) and the other by Snow (1974) have thoroughly discussed most of the recent research concerned with mothers' speech to their children who are acquiring language normally. In the present review, only certain major studies which have direct relevance to this particular study will be considered. The findings of some very recent studies are also worthy of consideration. Finally, the pertinent literature on linguistically deficient children will be reviewed briefly.

As a starting point in the investigation of the verbal environment of the young child, it seems obvious to consider the speech of the mother whose role is usually that of primary care-taker. Katherine Nelson (1973) reports a longitudinal study of the acquisition of first words by eighteen children between the ages of one and two years. It was found that mothers tended to use one of two characteristic styles of verbal interaction: either an object-oriented, question-asking, and relatively concise style, or else a behaviour-oriented, intrusive, discursive style. Moreover, at twenty-four months of age, the child's language maturity as measured by mean length of utterance and vocabulary shows a strong relation to the properties of object words in the mother's speech at an earlier period when the child was thirteen months old. This lag effect demonstrates the complex manner in which environmental variables can affect the language development of the child. It is not surprising that significant
correlations between aspects of the language the child hears and what he produces are difficult to discover.

In 1972, Broen's monograph provided detailed information about mothers' speech to their own children. Each mother had one child between eighteen and twenty-six months of age, and one child aged forty-five months or more. The study was conducted in an experimental setting and speech samples were collected within a short period of time. Also, the mothers were intentionally selected on the basis of their language teaching skill. In terms of the physical performance parameters of speech rate, lexical variability, and disfluencies per every one hundred words, in two different tasks, both free play and story telling, the mother's speech to the young child was adjusted more. Thus, mothers spoke less quickly, used a less diverse vocabulary, and had a lower disfluency rate when speaking to their younger children rather than their older children.

In the light of findings by previous investigators such as Drach (1969) and Phillips (1970), Broen carried out a detailed analysis of the form of speech addressed to the younger children. One technique for organizing the data was the use of five sentence categories. The corpus of utterances for each of the ten mothers in a five minute free play session with the younger child was coded in terms of single word sentences, imperative sentences, questions, declarative sentences, and grammatically incomplete sentences. These categories were not mutually exclusive. On the average, 14.9% were single word sentences, 36.9% were questions, 30.4% were declaratives, and 15.1% were grammatically incomplete (Broen, 1972, p. 29).

However valid the search for interesting generalizations may be, results must be interpreted with caution. For instance, Ferguson (1964)
emphasizes the variability that exists in the baby-talk style as it is used from one family to the next. Upon examining Broen's results more closely, the evidence of variability is striking. In particular, mother 1 used imperative sentences 43.5% of the time, whereas mother 4 used them 3.3% of the time. It is difficult to judge on the basis of a small quantity of data from each subject whether such contrasting results could represent a sampling bias, or whether they characterize a genuine difference, in this case, between how two mothers generally communicate with their respective children.

Other researchers have noted variation across mothers in the verbal environment they provide for their children. The approach used by Holzman (1974) is to analyze both the characteristic uses of language by each of the dyads including children that ranged in age from fifteen and one-half months to twenty-seven months. The verbal development of the children was matched on the basis of a mean utterance length of 2.0 morphemes. The data for each mother consisted of two samples of one hundred verbalizations each. It was concluded that the verbal environment provided by Adam's mother offered the greatest stimulus to cognitive development due to the greater amount of explicit teaching (Holzman, 1974). The only problem with this interpretation is that Adam was the oldest child in the study. Therefore, what appears to be an independent characteristic of the mother's verbal behaviour may, in fact, be correlated with the age of her child.

A recent study by Snow et al. (1976) proposed to examine the quality of speech offered by Dutch mothers from different social classes to their two-year-old children. The measurements on the grammatical structure of the mothers' speech revealed few significant differences among the social classes. The mother-child dyads were studied in both a free play and a
book reading situation. A noteworthy result was that more complex speech occurred in the book reading situation in which no significant class differences occurred. Utterances were also scored, by means of a modified version of the system outlined by Bloom (1970), on the basis of their function. Although this functional classification established large social class differences, statistical significance was not achieved.

Also, Snow mentioned individual differences in style and content of play, emphasizing the difficulty of measuring these differences objectively. Some mothers tended to play a "labeling game" with their children in both situations. These mothers would consistently require the child to name objects or pictures. The deficiencies of this approach became obvious when reading a story about a caterpillar: the mother taught the vocabulary items that were necessary but failed to explain that the caterpillar became a butterfly. At the opposite extreme were the mothers who not only discussed the story, but also related it to events in the child's life. These mothers imposed a narrative structure on the child's free play as well (Snow et al., 1976).

2.2.2 By Other Adults

In order to further weaken the rationalist position on language acquisition and, at the same time, strengthen the empiricist position, it must be shown that young children acquiring language are constantly the recipients of special, simplified verbal input. A few studies have clearly demonstrated that all adults modify their speech in similar ways, although to varying degrees, when they address young children. For example, Snow (1972) compared the speech of mothers and non-mothers. A striking result was the general absence of differences between the speech of mothers and
A recent paper by Berko Gleason (1975) entitled "Fathers and other strangers: Men's speech to young children" primarily discusses masculine speech input to young children. The principal data come from two male and two female daycare teachers at a small daycare facility, and from three fathers and three mothers at home with their children. The children receiving the verbal input were all of preschool age. Fathers as well as mothers were found to simplify their speech, but the fathers' output was felt to be qualitatively different from the mothers' due to the fathers' use of imperatives, threats, and affectionately insulting names. In summary, according to Berko Gleason, mothers and fathers had a number of differentiating features in their respective language styles which could be partially explained by the different roles occupied by the parents.

Furthermore, the speech input of the male and female daycare teachers to the children was both quantitatively and qualitatively very similar, as indicated by measurements of MLU, preverb length, topic of discourse, and repetitions. Berko Gleason concluded that: "Men, as well as women, modify their speech when addressing young children, and where the men occupy a nurturant role they become increasingly sensitive to the needs and intentions of the children." (p. 297)

Further research on Serbo-Croatian examines the problem of question acquisition. Savic (1974) studied question acquisition in a first-born pair of dizygotic twins and the adult speech in direct communication with these twins. By definition, "direct speech" was that intentionally aimed at the child, and was categorized in three ways: questions, commands, and statements. An analysis of the frequency and order of appearance of thirteen question types produced by each child was carried out in order to

non-mothers for communicating with two-year-olds.
determine to what extent their interrogative systems could be related to that of adults. The results of this study support two major previously mentioned points. First, that there is a lag effect in that the maximal conditions in the language environment are reflected at a later time in the language produced by the child, and second, that the adult and child are involved in an interaction process. In short, child speech and adult speech are phenomena that influence each other.

2.2.3 By Children

The study of speech modification made by children addressing younger children is of interest for two reasons. First, in order to make the claim that the production of a special speech register directed to young children is a learned sociolinguistic skill, evidence pertaining to the development of this skill is needed. Furthermore, in the late 1960's when cross-cultural studies on the environment of children learning language were begun, it was soon realized that older children, and not mothers, in some cultures were the primary care-takers of young children.

In an overview paper on the language input to children, Slobin (1975) summarizes the information gained in the cross-cultural studies. He concludes about the work by Blount (1969) and Kernan (1969) that, although the major speech input to young Luo and Samoan children acquiring their native language is from older children and not from adults, the course and rate of language development do not seem to be affected. Slobin emphasizes that the input from the older children to the preschoolers is grammatically similar to the input from adults. Despite the scanty data, the general finding appears to be that young children are exposed to a fairly consistent simplified speech register.
In 1973, two English language studies established the ability of young children to adjust their speech style. Shatz and Gelman (1973) analyzed the speech of four-year-olds to peers, two-year-olds, and adults. In terms of measures such as amount of speech, mean length of utterance, and quantity of various construction types, it was demonstrated that four-year-olds produced shorter, simpler utterances to two-year-olds. The speech of the four-year-olds in this context was simpler in the sense that the frequency of complex constructions, as well as the total number of long utterances, was lower. In summary, the authors stated about the rudimentary communication skill of the four-year-olds that "the younger their listener, the greater the tendency to use short, simple utterances and to make efforts to attract and sustain attention." (p. 34)

Furthermore, the study by Sachs and Devin (1973) elaborated on the contexts in which the simplified code occurs. As a result of the speech modifications noted, the authors concluded that young children do not depend on cues in the immediate situation, but have developed some more abstract knowledge of appropriateness of speech to listener. Also, it is noteworthy that even the youngest child, aged two years and four months, was found to use some sort of simplified code similar to the typical "mother language", although not to the same extent that this special code was used by older children.

Thus, the two studies just mentioned serve to demonstrate that the simplified speech code used to address young children is a learned sociolinguistic skill. Further research is needed to gain detailed information about the emergence of this skill.
2.2.4 Direct versus Indirect Speech

Much of the foregoing information comprises a consensus about the consistent nature of the simplified verbal input to young children. Finally, a point must be made about the aforementioned distinction between direct and indirect speech. It is obvious that the child's environment provides input that is not in the simplified code. For example, when adults talk to each other, the child is indirectly exposed to a speech code that is not adjusted for his benefit. However, many researchers noting this phenomenon have agreed that the direct speech input to the child is probably the most important in influencing language development. Ervin-Tripp summarizes this notion in the following way:

Children are exposed to a great deal of speech which is not addressed to them. But they probably "tune out" a good deal that is uninteresting or too complex, just as they turn off political commentators on television. There seem to be neurological bases to attention which simply eliminate from processing and storage a good deal to which we are exposed. So we have good grounds for believing that at least at the beginning the most important language in learning is the speech addressed to the child.

(Ervin-Tripp, 1971, p. 192)

Also, Snow (1976) cites some anecdotal evidence, obtained from T. van der Geest, that there are cases of Dutch children in eastern Holland who watch German television programs regularly, although they neither achieve appreciable control of German nor really understand the programs. This evidence, although inconclusive, suggests to Snow that being addressed in an appropriately simplified register of a particular language may be prerequisite to its acquisition by children.
2.3 The Results of Manipulative Experiments

Although the characteristics of the simplified speech code utilized when addressing young children have been well documented, there is little information about the extent to which children attend to and make use of this special input. The necessary and sufficient environmental conditions for a child to acquire his native language are not yet known, but the optimal conditions have been speculated upon. Information pertaining to this topic can only be obtained by means of manipulative experimentation, the design of which is notoriously difficult. Few manipulative studies have been executed and only two will be subsequently discussed.

In 1965, Cazden performed a manipulative experiment for the purpose of separating the effect of expansions from the effect of sheer quantity of well-formed speech. These two so-called training variables had been observed to occur in different proportions across mothers. The experiment was performed on a group of children attending a daycare center. One experimental group received forty minutes a day of intensive and deliberate expansions while the other group was exposed to an equal number of well-formed sentences that were not expansions. After a three month period, the noted changes in six measurements of syntactic development indicated that the well-formed sentence treatment proved to be somewhat more beneficial.

Different results reported by Keith Nelson et al. (1973) also confirm the facilitation of syntax acquisition. In this experimental design, adult experimenters spent twenty-two sessions with one treatment group to which replies were "recast" sentences that maintained the basic meaning of the child's utterance but provided new syntactic information. Another group received responses which were grammatically complete but
semantically unrelated to what the child said. In other words, the content words of the child's utterance were excluded. Finally, a control group received no experimental treatment.

On all of the five measurements of syntactic development, the children who had received the recast sentence treatment were more advanced linguistically than the children in the other two groups. However, trends in two measures showed that children in the new sentence group were only slightly less advanced in their performance than the recast sentence group. On no measure did children in the former group demonstrate that significant facilitation relative to the control group's performance had occurred.

The preceding discussion suggests that different types of intervention are more beneficial than others. However, it is still unclear what training strategies, among the many conceivable ones, are the most facilitative. In the context of the present paper, the information presented from two manipulative experiments serves to emphasize the role of the environment in the language acquisition process.

2.4 The Verbal Input to Children Who are Not Acquiring Language Normally

It is undeniable that psycholinguistic research has concentrated on the language development of the normal child. Consequently, information about the linguistically deficient child is relatively unavailable. An important consideration that has been mentioned cursorily by a few other researchers is stated thus by Menyuk (1975): "It has been noted, but not clearly researched, that mother-child interaction is either deficient and/or distorted in the case of children with developmental disabilities." (p. 135) This problem has recently attracted some researchers; however, a thorough review of all that has been attempted is not necessary for the
purpose of illustrating the variety of techniques used to investigate mothers' interaction with children who are not normal.

For example, McCarthy (1954) cites some early studies examining both the quantity and quality of mother-child interaction. The various studies in which an independent variable is the amount of contact with the mother support the general conclusion that the degree of delay in language development is related in some gradient to the intensity and duration of the mother's attention (McCarthy, 1954). There are many commonly expressed notions about the quality of the mother-child relationship and its effect on the development of the child, although little empirical evidence supports such notions. McCarthy provides the example that some infantile speech patterns such as lisping have been viewed as a reflection in the child of the smothering overprotective attitude of the mother. More recent studies have developed testable measurements to describe the quality of mother-child interactions.

One recent approach to the investigation of mother-child interactions associated with language delay is reported by Wulbert et al. (1975). These researchers chose to evaluate the home environment of children acquiring language by means of the Caldwell Inventory of Home Stimulation. This tool makes use of interview and observation techniques. The specific hypothesis of the research was that the same tendency towards greater restriction and less positive involvement with language-delayed children might be found across all social strata. The results of the study supported the hypothesis since low Caldwell scores were found throughout the socio-economic strata, indicating that the maternal-child relationship was more strongly influenced by language delay than by socio-economic factors. It should be emphasized that the Caldwell tool provides only a gross measurement of the
mothers' verbal behaviour. For example, some of the parameters are:

1) offers direct praise to the child at least once;
2) does not shout at the child during the visit;
3) does not express overt annoyance toward the child.

Such parameters provide insight about the quality of the interaction but do not adequately describe the linguistic behaviour.

In contrast, the measurements made by Buium et al. (1974) identify more clearly the specific variables that differ in the environments of language-delayed children versus normally developing children. In this study, each of the five mothers composing the normal group had a normal twenty-four-month-old child, while the six mothers in the non-normal group each had a twenty-four-month-old Down's syndrome child. The mother-child interaction was recorded by audio-video tape in three different situations: a play situation and two 2-minute structured situations in which the mother was to teach the child how to set a table. The data were analyzed in terms of twenty-one parameters which the authors grouped into the following categories:

1) grammatical features;
2) sentential structure;
3) vocabulary;
4) productivity.¹

The results of the study demonstrated that the frequencies of

¹ The twenty-one parameters investigated were: (1) indefinite pronouns, (2) personal pronouns, (3) main verbs, (4) secondary verbs, (5) negatives, (6) conjunctions, (7) interrogative reversals, (8) WH questions, (9) single word sentences, (10) imperative sentences, (11) declarative sentences, (12) grammatically incomplete sentences, (13) questions, (14) raised intonation questions, (15) Type Token Ratio, (16) total words, (17) total utterances, (18) mean length of utterances, (19) total sentences, (20) mean length of sentences, (21) word rate per minute.
occurrence of some linguistic parameters in certain situations were significantly different in the two groups. The authors cited Brown (1970) to emphasize that one factor possibly influencing the child's course of language acquisition is the frequency with which certain grammatical forms are used. It was found, for example, that the Down's syndrome children were exposed to a higher number of utterances yet a lower mean length of utterances, and a higher frequency of grammatically incomplete sentences, imperative sentences, and single word sentences (Buium et al., 1974). However, the authors acknowledge the need for further research to confirm the relationship between certain parameters of the early language environment of retarded children and characteristics of their subsequent language production. Furthermore, they maintain that because the language acquisition device of Down's syndrome children must operate on linguistic data that is somewhat different from the data input to normal children, this fact is worthy of careful consideration in any attempt to understand the language development of the non-normal child.
CHAPTER 3

STATEMENT OF PROBLEM

Language intervention programmes proceed on the assumption that the language-delayed child, who is having difficulty in acquiring his first language, will benefit from a different environment which provides further exposure to the very forms and structures he was previously unable to learn. Implicit in all of the foregoing material is the notion that some environments facilitate language acquisition more successfully than others.

In the past decade, psycholinguistic research has been primarily concerned with the environment of the child who is acquiring his first language normally. To date, no research has investigated the verbal environment of the child who is language-delayed despite a lack of apparent intellectual or physiological deficit. For such a child, environmental factors might play an especially important role in the language acquisition process.

It has been demonstrated universally that the verbal input to the young child acquiring language normally is simplified in comparison with communication between adults or somewhat older children. Many different parameters have been used to characterize the simplified speech code on physical performance, lexical, grammatical, and functional levels of analysis.

The primary aim of the present research was to discover the characteristics of the mother's verbal input to her language-delayed child, and compare these characteristics with those typical of her verbal input to the younger child who appeared to be acquiring language normally. Another
question asked was how the verbal environments provided by different mothers of language-delayed children compare. The final issue involved characterizing the speech style used by the mother when she was interacting in a context in which both children were present.
CHAPTER 4

METHOD

4.1 Selection of the Subjects

Initially, five families satisfying the following criteria were contacted:

1. The parents are both native speakers of English, and English is the language spoken in the home.
2. There are at least two children in the family.
3. The older child, aged four to seven years, has been recently assessed by a speech therapist as language-delayed without the complication of any organic defect.
4. The younger child, aged two to four years, appears to be acquiring language normally.

Each family was then visited by the investigator for the purpose of describing the proposed research and also to informally judge the linguistic proximity of the siblings. A brief written outline was given to the mothers who were not informed specifically that their language was of interest but rather that the purpose of the research was to study the language interaction that takes place in the home, involving a child with language problems, his or her normal younger sibling, and their mother. One family was eliminated after this first visit because the young sibling was under two years old and produced very little speech.

On the following home visit, which occurred between two and four weeks subsequent to the first visit, data collection was initiated. From each of the eight children the investigator elicited a language sample for
at least fifteen minutes. On the basis of the intelligibility and amount of speech produced by the child, two families were selected for further study.

Both families chosen had two children, both of whom were boys. In each case, the older boy had started to receive speech therapy once a week in September 1975, and at the same time had started to attend nursery school three afternoons a week. Each of the younger brothers remained at home, and neither mother worked outside her home. The investigator judged that both families belonged to the middle class although specific socio-economic information was not elicited.

The age and mean utterance length (MLU) for each boy at the time of the initial language sample were as follows: in the first family (F1), the normal child (N1) was 2-11 with an MLU of 3.55; and the language-delayed child (D1) was 4-9 with an MLU of 3.39. In the second family (F2), the normal child (N2) had an MLU of 2.31 and was 2-5, while the older boy (D2) was 4-4 and had an MLU of 3.66. The MLU measurement as described by Brown (1973) is often used to estimate the child's language performance level. The MLU values stated above were calculated on the basis of the first one hundred utterances in the initial language sample. On this basis then, the boys in F1 appeared to be at a similar language level, whereas N2 and D2 were clearly functioning at different levels.

4.2 Procedure

Since no standard exists, it was arbitrarily decided that a thirty minute language sample would be collected in free play contexts in the following order:

1. The mother interacting with the younger child.
2. The mother interacting with the older child.
3. The mother interacting with both children together.

In all contexts the mothers were encouraged to use toys if they so desired. They were reminded that the goal of the study was to learn about the language of each child. Data were consistently collected in one room of the home at around 10:30 in the morning which was the most convenient time for both mothers.

The data were recorded on an Amplex 601 reel-to-reel tape recorder at 7½ inches per second. Ampex 631, 1.5 millimetre polyester tape was used. The microphone used was an Altex 681A mounted on a stand and placed as unobtrusively as possible. The mouth-to-microphone distance varied greatly as the subjects moved around, and consequently, even though the microphone record level was set at maximum, a few utterances in each context were inaudible. The investigator wrote observational notes throughout each session so that contextual information would be available to aid in transcribing the data.

The data for all three contexts were collected within a two week period for each family. Including the initial language sample involving the investigator, all the data were collected within a one month interval.

At all times during the thirty minute collection sessions, the investigator remained as unobtrusive as possible, avoiding eye contact and verbalization with the subjects. The mother had been forewarned about this behaviour and given the explanation that thus the interaction observed would be as close to what it would normally be with the involvement of family members only.
4.3 **Transcription of the Data**

The tapes were transcribed as soon as possible after they had been recorded. Each tape was listened to in entirety three times by the investigator. On the first listening, the child's utterances were transcribed by a broad phonetic transcription according to the International Phonetic Alphabet notation. At the same time, the mother's utterances were transcribed into standard English orthography for the most part. A few unintelligible utterances were transcribed phonetically. On the second listening, the original transcriptions were modified somewhat. Prosodic information, including primary sentence stress and intonation contours, was added. Also, transliterations of the child's utterances into English orthography were made where possible. Then on the third listening, contextual information obtained from the written observational notes was added.

The difficulty of transcribing the third context necessitated some alteration of the above procedures. All of the mother's utterances were transcribed on the same day the data were collected. At the same time, the destination of her utterances was coded as being directed to one child or the other. A third category was used for those utterances which were ambiguous in the sense that they could have been intended for both children, or it was unclear who they were directed at.

Subsequently, a transcription of the children's utterances was made. Quite frequently both children were talking at once, making noises with various toys, and moving away from the microphone. At best, these circumstances yielded only one child's utterances that were intelligible enough to transcribe. Even when the interaction was taking place it was impossible to understand everything said by each child. Therefore, it
was decided that, where possible, a transcription would be made of what was said by the child whom the mother was addressing. This procedure proved workable most of the time. The resulting transcription was checked and prosodic and contextual information were added as in the first two contexts.

Finally, all the data in the third context and at least fifteen minutes of the other two contexts were checked by another investigator who was instructed to modify the transcriptions in any way she felt necessary. All measurements of the data took into consideration the modifications made by the second listener.

4.4 Analysis of the Data

4.4.1 The Language of the Children

The language level of each child was estimated in terms of the mean length of the first one hundred utterances in the initial language sample (per Brown, 1973). In addition, the language level of each of the boys was calculated from the first or second context according to the method of Tyack and Gottsleben (1974). This analysis was necessary because it provides a more comprehensive picture of the language level of the child than MLU alone.

4.4.2 The Language of the Mother

4.4.2.1 Physical Performance Parameters

The quantity of speech produced by the mother was determined in
each context by counting the number of utterances she produced. The
criteria outlined by Brown (1973) were then used to calculate the mean
length of the total number of utterances produced by the mother in each
context. Also, the average of the five longest utterances was calculated
for each context.

Various methods for measuring speech rate have been used by other
investigators. For the purposes of this study the method outlined by Drach
(1969) was chosen. Speech rate in syllables per second was calculated as
an average of the rates of thirty-five grammatical sentences distributed
randomly throughout the sample in each of the three contexts. Each sen­tence was timed with a stopwatch to the nearest 1/10 of a second. Each
measurement was repeated three times and the mean value of the three
measurements was then used to calculate the ratio of the number of syll­
ables in each sentence to the amount of time taken to articulate the whole
sentence. Finally, the average value of thirty-five sentences was calcu­
lated.

Another measurement which can be considered a physical performance
parameter is lexical variability. As Broen (1972) suggested, the token
size used was one hundred words. Words differing in dictionary spelling
were counted as different types. Thus, a type-token ratio (TTR) for each
mother was calculated on the basis of the first one hundred words in each
of the three contexts.

Repetition was another of the physical performance measurements.
The procedure used was first described by Snow (1972) where three cate­
gories of repetition were differentiated, but then reduced to two cate­
gories in Snow (1976). Consequently, in the present study the earlier
criteria were used to code repetitions as complete, partial, or semantic.
Then the semantic repetitions were added to the partial repetitions and two ratios were calculated. For all the contexts, the number of complete repetitions to the total number of utterances and the number of partial repetitions to the total number of utterances were the two ratios calculated.

4.4.2.2 Structural Parameters

In the present study utterances were grouped into the following construction type categories: imperatives, inverted questions, intonation only questions, wh-questions, tag questions, negatives, affirmative declaratives, and single word utterances. These categories were not mutually exclusive.

Also, two measurements were used for the purpose of describing the grammaticality of the mothers' speech. According to the principles outlined by Snow (1972), the incidence of utterances without verbs was calculated. Snow found this to be a useful measurement of the formal correctness of mothers' speech since a higher incidence of utterances without verbs is indicative of a tendency to produce sentence fragments.

As a further measure of the formal structure of the mothers' speech, the percentage of grammatically incomplete sentences was determined in each context. All one word utterances, numbers, sentences with undetermined elements, and stereotyped expressions such as "yes please" and "hey now" were excluded from the count of grammatically incomplete sentences. However, false starts, missing or incorrect inflections, missing auxiliary verbs and articles and subject pronoun phrases caused utterances to be scored as grammatically incomplete. Previous researchers have not been so specific about their scoring criteria.
4.4.2.3 **Functional Parameters**

In the present study all utterances were coded into the four functional categories used by Snow (1976) to analyze the speech of mothers. Earlier, Bloom (1970) had scored children's utterances as reports, comments, questions, or directions and Snow modified the scoring criteria somewhat to suit the purpose of analyzing the function of adult speech.

In addition, the function of the mothers' interrogative forms was analyzed in detail. According to the system described by Holzman (1972), interrogatives were classified into the following five categories:

A. Requests for information.
B. Requests for behaviour.
C. Questions designed to display or test the knowledge of the hearer.
D. Interrogatives in which what is questioned is not in the verbalization.
E. Uses of the interrogative form for purposes other than questioning.
   1. Questions whose force is a suggestion for the direction of the child's behaviour.
   2. Questions whose force is a negative evaluation of the child's behaviour.
   3. Questions that are really reports.

This system appeared to be sensitive enough to be able to detect any qualitative difference in the mothers' use of interrogative forms.
CHAPTER 5

RESULTS

5.1 The Language of the Child

The results of the Tyack and Gottsleben analysis confirmed the linguistic proximity of N1 and D1 who were both assigned to the fourth developmental language level. D1 achieved a word-morpheme index of 4.09 and his utterances ranged in length from 2-2 to 12-12. This kind of index is projected as a measurement of language competence rather than the purely performance measurement advocated by Brown. N1 produced utterances ranging from 2-2 to 10-10 and his word morpheme index was 4.56. Both brothers in Fl demonstrated a variety of construction types commensurate with their language level. For the most part, the missing forms noted were considered to result from a sampling bias, since pictures were not used to elicit the forms in question. Neither brother had achieved the 90% criterion level for plurals, articles, the third person singular present tense, or the copula form. However, D1 did make a greater percentage of errors than N1. Therefore, taking into consideration the age difference between the two brothers, D1 could be considered slightly language-delayed. In addition, it was noted that his phonological system was not as advanced as his brother's.

In the other family, N2 was assigned to the second developmental level on the basis of his 2.93 word-morpheme index and his utterance length range from 2-2 to 6-7. D2 achieved a word-morpheme index of 3.78, and his utterances ranged from 2-2 to 7-7. Consequently, he was assigned to the third developmental language level. N2 had not achieved the criterion for
his language level in articles or the present progressive tense, while D2 had not reached the criterion level for articles, some pronouns, the copula form, and the present progressive tense. Both brothers in F2 demonstrated a suitable variety of constructions for their respective language levels. D2 was considered to be slightly language-delayed.

All of these results confirmed the initial impressions gained by the performance MLU measurement on the initial language sample in which each child interacted with the present investigator who was a stranger to the child.

5.2 The Language of the Mother

5.2.1 Physical Performance Parameters

The number of utterances, MLU, and upper bound of the two mothers and their normal and language-delayed children in the three contexts is summarized in Table 1. The most striking differences occurred in the MLU and upper bound values for the two mothers. M1 used an MLU of approximately 6.0 morphemes when addressing either child separately and when they were all together, and her upper bound in all three contexts was around 23 morphemes. On the other hand, M2 used an MLU of about 4.4 when addressing N2, and 4.9 when addressing D2. In the third context, most of M2's utterances, 53%, were directed to D2 while 33% were to N2 and 14% were ambiguously directed. Therefore, it is not surprising that the MLU of M2 in the third context is 5.0. Similarly, in contexts two and three, her upper bound is around 16.0 morphemes while it is only 12.0 in the first context. These results differentiated a style that was characteristic of each mother and furthermore, showed that M2 adjusted her speech more for her younger child.
**TABLE 1**

Number of Utterances, MLU and Upper Bound of the Two Mothers and Their Normal and Language-Delayed Children in Three Contexts

<table>
<thead>
<tr>
<th>Contexts</th>
<th>Mother 1</th>
<th></th>
<th>Mother 2</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Utterances</td>
<td>MLU</td>
<td>Upper Bound</td>
<td>No. of Utterances</td>
<td>MLU</td>
<td>Upper Bound</td>
<td></td>
</tr>
<tr>
<td>Context 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother</td>
<td>261</td>
<td>6.11</td>
<td>21.00</td>
<td>266</td>
<td>4.39</td>
<td>12.20</td>
<td></td>
</tr>
<tr>
<td>Normal Child</td>
<td>417</td>
<td>3.46</td>
<td>9.80</td>
<td>240</td>
<td>2.15</td>
<td>5.40</td>
<td></td>
</tr>
<tr>
<td>Context 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother</td>
<td>217</td>
<td>6.18</td>
<td>22.60</td>
<td>420</td>
<td>4.87</td>
<td>16.00</td>
<td></td>
</tr>
<tr>
<td>Delayed Child</td>
<td>318</td>
<td>3.19</td>
<td>10.40</td>
<td>442</td>
<td>2.73</td>
<td>7.80</td>
<td></td>
</tr>
<tr>
<td>Context 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother</td>
<td>320</td>
<td>6.14</td>
<td>24.00</td>
<td>555</td>
<td>5.00</td>
<td>16.20</td>
<td></td>
</tr>
</tbody>
</table>

*Refer to Chapter 6 for an explanation of the lack of results for the children in this context.*
Table 2 summarizes the rest of the physical performance measurements. In general, these results also characterized a style typical of each mother. M2 spoke more quickly than M1. It was interesting that both mothers spoke slightly more slowly in the second context in which they interacted with their language-delayed child and most slowly in the third context. Also, it was noteworthy that N2, being the youngest child in the study, received verbal input distinguished by the lowest TTR and the highest number of complete repetitions.

5.2.2 Structural Parameters

The structural parameters characterizing the speech of the two mothers in three different contexts is summarized in Table 3. In brief, the results grossly differentiated the styles of the two mothers. M2 tended to use a much higher proportion of wh-questions, utterances that were non-grammatical, and a higher incidence of utterances without verbs than M1. Comparing the results in context one with those in context two for each mother, the most striking differences occurred in the speech of M2. In context one she produced approximately 11% more questions and 12% fewer affirmative declarative utterances. An analysis of the question types used by each mother demonstrated that M2 favoured the wh-question and played a naming game with both of her sons whereas M1 used the inverted question more often.

For the third context, the results are comensurate with the stylistic characteristics evident in the first two contexts. In the third context the mothers each asked a comparable percentage of questions, roughly 29%; however, M1 used more inverted questions while M2 used wh-questions more often. Concomitantly, M1 used approximately 11% more
<table>
<thead>
<tr>
<th>Parameters</th>
<th>Mother 1</th>
<th>Mother 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Contexts</td>
<td>Contexts</td>
</tr>
<tr>
<td>1 To Normal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 To Delayed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 To Both</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speech rate in syllables per second</td>
<td>5.31</td>
<td>5.19</td>
</tr>
<tr>
<td></td>
<td>4.53</td>
<td>7.23</td>
</tr>
<tr>
<td></td>
<td>6.98</td>
<td></td>
</tr>
<tr>
<td>Lexical variability of the first 100 words</td>
<td>.60</td>
<td>.58</td>
</tr>
<tr>
<td></td>
<td>.61</td>
<td>.49</td>
</tr>
<tr>
<td></td>
<td>.56</td>
<td>.64</td>
</tr>
<tr>
<td>Percentage of repetitions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete</td>
<td>.76</td>
<td>1.47</td>
</tr>
<tr>
<td></td>
<td>3.43</td>
<td>6.02</td>
</tr>
<tr>
<td></td>
<td>.47</td>
<td>3.24</td>
</tr>
<tr>
<td>Partial</td>
<td>12.64</td>
<td>15.12</td>
</tr>
<tr>
<td></td>
<td>18.43</td>
<td>16.91</td>
</tr>
<tr>
<td></td>
<td>13.57</td>
<td>11.17</td>
</tr>
</tbody>
</table>
### TABLE 3

**Structural Parameters of the Two Mothers' Speech in Three Contexts**

<table>
<thead>
<tr>
<th>Percentage of Structural Types</th>
<th>Mother 1</th>
<th>Mother 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To Normal</td>
<td>To Delayed</td>
</tr>
<tr>
<td>Imperatives</td>
<td>7.27</td>
<td>7.74</td>
</tr>
<tr>
<td>Questions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intonation only</td>
<td>6.13</td>
<td>5.90</td>
</tr>
<tr>
<td>Inverted</td>
<td>11.11</td>
<td>8.11</td>
</tr>
<tr>
<td>Tags</td>
<td>11.49</td>
<td>5.90</td>
</tr>
<tr>
<td>Wh-questions</td>
<td>8.81</td>
<td>5.53</td>
</tr>
<tr>
<td>Total questions</td>
<td>37.54</td>
<td>25.44</td>
</tr>
<tr>
<td>Negatives</td>
<td>12.64</td>
<td>8.11</td>
</tr>
<tr>
<td>Affirmative declaratives</td>
<td>30.65</td>
<td>43.54</td>
</tr>
<tr>
<td>Single word utterances</td>
<td>20.68</td>
<td>16.23</td>
</tr>
<tr>
<td>Utterances without verbs</td>
<td>29.50</td>
<td>29.52</td>
</tr>
<tr>
<td>Grammatically incomplete utterances</td>
<td>12.64</td>
<td>13.65</td>
</tr>
</tbody>
</table>
affirmative declarative sentences than M2 who used 8% more single word utterances and 6% more utterances without verbs.

5.2.3 Functional Parameters

The results of classifying utterances by function as reports, comments, directions, and questions for all contexts are summarized in Table 4.

The functional characteristics of each mother's verbal code are clearly demonstrated. In all contexts M1 used more reports, comments, and questions, while M2 used more directions. Some similarities can be seen in the way the mothers adjust their speech when interacting with their older sons. For example, utterances functioned more often as reports and comments when the older son was addressed.

A summary of the functions of the interrogative forms used by the mothers in all contexts can be seen in Table 5. The analysis revealed that 23% of M1's interrogatives in context one were real questions and 9% were test questions, whereas in context two 54% real questions and 4% test questions were asked. M2 also used more real questions in context two, that is, 43% versus 11% used in context one, but she used 50% test questions in context one and 19% test questions in context two. A higher percentage of M1's interrogatives functioned as reports and suggestions in both contexts.

In both cases the mothers directed more interrogatives to their older sons. There is evidence of the same functional types being preferred by each mother in context three as in the first two contexts. M1 used 45% real questions and 7% test questions as opposed to 23% of the former and 31% of the latter form used by M2. These values are particularly indica-
TABLE 4

Mothers' Utterances in Three Contexts
Classified According to Bloom's Functional Types

<table>
<thead>
<tr>
<th>Bloom's Functional Types</th>
<th>Mother 1</th>
<th>Mother 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>To Normal</td>
<td>3.06</td>
<td>5.90</td>
</tr>
<tr>
<td>To Delayed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To Both</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reports</td>
<td>53.25</td>
<td>56.45</td>
</tr>
<tr>
<td>Comments</td>
<td>14.55</td>
<td>12.17</td>
</tr>
<tr>
<td>Directions</td>
<td>23.37</td>
<td>20.29</td>
</tr>
<tr>
<td>Questions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TABLE 5

Mothers' Interrogative Forms in Three Contexts
Classified According to Holzman's Functional Types

<table>
<thead>
<tr>
<th>Holzman's Functional Types</th>
<th>Mother 1</th>
<th>Mother 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>To Normal</td>
<td>To Delayed</td>
</tr>
<tr>
<td>A</td>
<td>23.23</td>
<td>54.16</td>
</tr>
<tr>
<td>B</td>
<td>1.01</td>
<td>0</td>
</tr>
<tr>
<td>C</td>
<td>9.09</td>
<td>4.16</td>
</tr>
<tr>
<td>D</td>
<td>11.11</td>
<td>4.16</td>
</tr>
<tr>
<td>E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Reports</td>
<td>20.20</td>
<td>11.11</td>
</tr>
<tr>
<td>2. Suggestions</td>
<td>30.30</td>
<td>18.05</td>
</tr>
<tr>
<td>3. Negative Evaluations</td>
<td>5.05</td>
<td>8.33</td>
</tr>
</tbody>
</table>
tive of functional differences in the mothers' usage because the percentage of interrogatives in relation to the total number of utterances produced by each mother was so similar.

In terms of differential usage with respect to each son, except for interrogatives that functioned as suggestions, it does not appear that M1 used any function of the interrogative form to a remarkably different extent when addressing D1 versus N1.

In contrast, M2 tended to differentiate more clearly between her sons on the basis of the function of the interrogative form she used. A strikingly different proportion of interrogatives in the first and third functional categories was addressed to D2.
CHAPTER 6

DISCUSSION

6.1 Review of the Present Results in Relation To Theory and Previous Research

There is some evidence that both mothers made more adjustments when speaking to their younger children. Both mothers directed more questions than affirmative declaratives and more single word utterances to their younger sons. M2 directed more repetitions to N2 in context three despite the fact that she interacted only 33% of the time with him and 53% of the time with his older brother. Similar results have often been reported by other researchers as typical of the verbal interaction of a mother with her young child (Snow, 1972; Broen, 1972).

In fact, M1 directed more repetitions to her older versus younger son, contrary to what would be predicted. At first glance, this adjustment might be interpreted as an attempt to provide a facilitative environment for the language-delayed child. This interpretation, however, is not valid because M1 used repetitions primarily in an effort to manipulate her older son's behaviour. For example, in the third context she repeated, "Can you sing 'Spiderman'?" five times to D1 because she wanted him to sing it, despite the fact that N1 started to comply with this suggestion twice and D1 never made any attempt to.

The most clear-cut results were the differences between the two mothers' styles of interaction. M1 imposed a narrative structure on her interaction with each child in contrast with the "labeling game" style used by M2. These opposing styles were described recently by Snow et al.
(1976) and earlier Katherine Nelson (1972) noted likewise that mothers could be divided into two styles of interaction on the basis of vocabulary.

The relatively low percentage, 14.25%, of utterances whose destination was ambiguous, characteristic of M2's speech in context three is further evidence of the fairly careful differentiation she made in communicating with one versus the other son. In contrast, about 38% of M1's utterances in the third context could not be assigned to either son in particular. These results are evidence that the mothers were sensitive to the language levels of their children. M1 did not need to adjust her speech code in a remarkably different way for each son because they were at the same language level, whereas M2 appropriately adjusted her speech more to accommodate her younger son's lower language level. The sensitivity of mothers to the linguistic capabilities of their children has been pointed out by previous researchers such as Moerk (1972).

By far the most striking characteristic of M2's speech was its speed and lack of clarity. It was difficult to transcribe some of her utterances into English orthography because of this tendency. At one point she said: "[wezwez] put this back together first, huh?" which was completely transliterated as: "Well I guess we have to put this back together again, huh?" Previous research on the verbal input to young children has emphasized the slowness and careful articulation of mothers' speech which presumably provides a signal that facilitates decoding by the LAD. M2's speech could not be described as a good teaching model in this sense. It is possible that due to the presence of an adult intruder, M2 did not adjust her speech rate for the benefit of her sons, but since they seemed to have no trouble understanding her, this explanation is unlikely.

It was mentioned previously that the precise amount and quality of
verbal input necessary and sufficient for the normal acquisition of a first language is unknown. Such a specification might prove impossible due to the widely acknowledged variety in rate of first language acquisition. Roger Brown has expressed the following thoughts about the normal language acquisition process:

Though the order of acquisition of linguistic knowledge will prove to be approximately invariant across children learning one language and, at a higher level of abstraction, across children learning any language, the rate of progression will vary radically among children.... What will the determinants be? No one can know at present. No doubt there are family interaction variables that will account for some of the variance but I will go out on a limb and predict that, within some as yet unknown limits of interaction variation, the rate will also prove to be dependent on what the intelligence testers call g or general intelligence.

(Brown, 1973, p. 408)

The results of the present investigation should be considered in the light of the above suggestion.

From the results that have been presented here, it is suggested that both mothers make assumptions about the language levels of their children. The presence of a disorder appears to cause each mother to alter her speech style somewhat. It would be unjustifiable to conclude, solely on the basis of these results, that language delay can be explained to any extent whatsoever by the nature of the mother's verbal input to the child. Nevertheless, the results stated here are not sufficient to rule out the possibility that the mother's speech, or even some other variable in the verbal environment of a language-delayed child contributes to his difficulties in acquiring a first language.
6.2 Limitations of the Present Investigation

6.2.1 Subjects

Only two families were studied, and the language delay of the older child was not severe. A larger number of subjects, including children with more serious language problems might well reveal more interesting and varied speech adjustments on the part of the mothers. Also, it is acknowledged that one important variable might be the amount and kind of instruction the mother has received from a speech therapist. No method of control could be found for use in the present study and any consequent bias is unknown.

6.2.2 Procedure

It is commonly accepted that observation studies introduce problems of construct validity, observer bias, observer and coding reliability, and behaviour sampling (Lytton, 1971). Some of the steps mentioned by Lytton were taken in order to reduce distortion. For example, when the mother initially appeared embarrassed, the observer assured her that this was understandable and suggested she should try to ignore the intruder's presence. The advantages of collecting first-hand data in the home environment were felt to outweigh the problems of distortion caused by observation.

Another limitation is that no sample of the mother's speech to another adult was collected for the purpose of comparison. This lack was mentioned by Snow et al. (1976) but was not considered to be a serious limitation to her study.

The present investigation did not take into account in any formal way the non-verbal interaction between the mother and the child. At times
in the third context an utterance was coded as being directed to one child if the mother was looking at him. Broen (1972) has suggested the significance of the non-verbal dimension which could be investigated by means of video tape recordings.

In addition, information about the mother's attitude toward each of her children, gained through a questionnaire, might provide valuable insight about the quality of the interaction. Informally it appeared that M1 found D1 uncooperative, and she preferred interacting with his younger brother. In spite of further objective information on the mother's attitudes, it is not clear what the implications would be for the child's language development.

6.2.3 Analysis

There are obvious problems with any analysis of utterance function, primarily due to observer coding reliability and the fact that an utterance may be classified a priori in more than one functional category. Also, because of an insufficiency of contextual information, some judgments had to be made with little confidence. Despite these limitations that were stated by Holzman (1972), the two types of functional analysis used in the present investigation were sensitive enough to demonstrate the existence of a qualitative difference in the mothers' use of utterance function. More importantly, the difference noted was commensurate with the results of other analyses.
6.3 Implications for Theory and Future Research

A number of interesting questions about the relevance of the observed characteristics of mothers' speech to the language-learning process remain unanswered. The investigator would suggest that M2 is not as good a language teacher as M1. However, the scope of the present study did not allow for a direct relation of the mother's speech to the language development of her children. This purpose necessitates longitudinal studies in which speech and language skills are not being acquired normally, in addition to controlled intervention studies which could determine the efficacy of environmental assistance (Broen, 1972).

Also, due to the growing popularity of daycare facilities for very young children, knowledge about the effect of this environment on the language development of the child is necessary. It is interesting that both mothers in the present study attributed improvement in the language of their older sons to attendance at nursery school rather than speech therapy.

The assumed reason for the adjustment of speech when addressing a young child is to simplify the decoding task for him. There is probably some trade-off between how long this simplified input is beneficial to the child and when it, in fact, becomes detrimental. Future research may contraindicate simplification after the child has reached a certain language level due to the detrimental effect of continued exposure to a simplified verbal environment.
6.4 Summary

The present research investigated the verbal environment provided in the home by each of two mothers to her two young sons. In each case, the older sons, aged 4-5 and 4-9, were language-delayed despite no apparent intellectual or physiological deficit, and the younger sons, aged 2-6 and 2-11, appeared to be acquiring language normally.

Data were collected in three free play contexts in the following sequence:

1. The mother interacting with the younger child.
2. The mother interacting with the older child.
3. The mother interacting with both children together.

For each family the thirty minutes of data collected in each of the three contexts was analyzed in terms of physical performance, structural, and functional parameters.

The results demonstrated that in all contexts the mothers' speech styles were characteristically differentiated from each other. There was some evidence, as indicated primarily by the speech rate parameter, that each mother made assumptions about the verbal input needs of her language-delayed child, and adjusted her speech accordingly.
REFERENCES


APPENDIX

The Appendix contains four sample transcriptions, one for each child, including the first twenty-five utterances produced by the child and the mother's responses to him during that time.
(Nl is aged 2 years, 11 months, and 11 days. He and Ml are in the boys' bedroom and Ml has just dumped a box of large blocks in the middle of the floor. The observer is seated on one of the boys' beds.)

**Nl**

1. [khąjʔ]
   ok
2. [dəs gow]
   There go
3. [mə pʰvdr]
   I'm gonna put this -
4. [hau bowdə br? gər dow]
   How about a big castle?
5. Yeah
6. [ʔeʃ rəz ənəʔə wən]
   Hey here's another one.
7. [ɪnənəwə pʰv dap tʰap]
   Here's another one put up top.
8. [hiʃ]
   Here
9. [ŋ hiʃ]
   And here
10. [ŋ hiʃ]
   And here

**Ml and Context**

Let's see what we can do.

Oh I think that sounds like a really good idea.

(Nl puts blocks on top of one another one by one to build a tower)
11. [haup' haupowču 'həpʰimij]
   How about helping me?

12. Oh

13. [kʰmɪ'næ nəwən]
   Coming down one

14. [iθə hajʔə] (whispered)
   It's a high one.

15. [m 'bekrdə hajwən]
   And make it a high one.

16. [dəɾ dəɾiə haj wən]
   This is a high one.

17. [əj now gwə həpŋ nət]
   I know what happen next.

18. [nowə gəi həpŋ ndiʔ]
   Know what going happen this

19. [ʔə 'bəowdəu 'ækʰ]
   It fell down< >

20. [əbι bəowdəu kju meʔmɪnəwən]
   If it fell down, can you make me another one?

21. [ŋgand' tæ 'dədəmij]
   and gonna pass those to me

22. [dəɾ]
   There
23. [nauʔ  kʰə fˈtəw ˈdāu]
Now it can't fell down.

24. [ʔuʔ ʔu drkʰiכ]
Put these here

25. [dowdə  dowdə hənə]
Those are hands

OK. (Ml adds blocks to the tower where Nl has indicated.)

Those are hands, are they?
SAMPLE 2

(N2 is aged 2 years, 5 months, and 24 days. He and M2 are seated on the floor in the living room. The toys on the floor and the nearby coffee table are: a Fisher Price puzzle board, a box of cars and trucks, Fisher Price people, Sesame Street finger puppets, and a toy barn filled with plastic animals. The observer is seated in a chair. N2 has just picked up a blue truck.)

<table>
<thead>
<tr>
<th>N2</th>
<th>M2 and Context</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ['dæwɔ]</td>
<td>What's that?</td>
</tr>
<tr>
<td>2. ['wa?]</td>
<td>What is that?</td>
</tr>
<tr>
<td>Truck</td>
<td>What kind of truck?</td>
</tr>
<tr>
<td>3. ['buwa?]</td>
<td>A blue truck, right.</td>
</tr>
<tr>
<td>Blue truck</td>
<td>(M2 starts to put a toy figure in the truck.)</td>
</tr>
<tr>
<td>4. [du majsɛf]</td>
<td>OK. You put the little man in the truck.</td>
</tr>
<tr>
<td>Do myself</td>
<td></td>
</tr>
<tr>
<td>5. [kʰej]</td>
<td>You put one of the men in the truck.</td>
</tr>
<tr>
<td>OK</td>
<td></td>
</tr>
<tr>
<td>6. Oh</td>
<td>This way. (M2 puts a man in the truck.)</td>
</tr>
<tr>
<td></td>
<td>See?</td>
</tr>
<tr>
<td></td>
<td>See we put a man in the truck.</td>
</tr>
<tr>
<td>7. [ʔmʔnaʃwɔ?]</td>
<td>Uh-huh</td>
</tr>
<tr>
<td>A man in truck</td>
<td>Put some more in</td>
</tr>
</tbody>
</table>
8. ['?e?j]
   OK
9. [t?i?tt 'm?an]
   It's a man
10. [k?ej]
    OK
11. [t?i?e ti?a?]
    This a < > truck.
    Uh-huh
    What other men have you got?
12. [da?w?n]
    That one
13. [da? ba?gowai de?]
    That boy go right there.
    OK
    That one goes in fire truck.
14. [e?n]
    In
15. ['?e?n]
    In
16. [di?g?ow fa?j twa?]
    This one go fire truck.
    (N2 puts another man in the fire truck.)
    And that one goes in the fire truck too, huh?
    Ok
17. ['ci? gow 'bow?]
    Boy go boat.
    OK
    (M2 picks up a toy plane)
    What's this?
N2

18. [fwiŋ]
   Plane

19. [tsam boegowę]
   uh-huh boy go plane

20. [daowən gowait' . . 'wʌp']
   That one go right up.

21. [m ?ʁ]
   < >

22. [daewəŋgowai 'dɛwa]
   That one go right there.

23. [boe gowai 'dɛwa]
   Boy go right there

24. [ʔoʔ ʔo]
   Uh-huh

25. [kejʔ]
   OK

M2 and Context

A plane?

What else you gonna put in it?
(N2 puts a man in a truck)

Right

Or else you could -
(N2 puts a man in another truck.)

OK

(N2 tries to fit a man in another truck but the figure is too big and won't fit in.)

Hey that boy's too big.

You find a little boy.
SAMPLE 3

(Dl is aged 4 years, 9 months, and 8 days. He and his mother, Ml, are sitting in the middle of the floor in the boys' bedroom playing with plastic pull-apart "cootie" bugs. The observer is seated on one of the boys' beds.)

Dl

1. [ˈnɔwɔn dɔu] Another one down?
2. ['diwɔn] This one?
3. [ˈpʰɪkwɔn] Pink one?
4. [mami aju bɛkɪŋə] Mummy are you making the-
5. [aju - aju pwɛkiŋ bɔɛk' tugɛ] Are you putting it back toge(ther)
6. [nɛˈdju] And then you -
7. [ˈnɔwakʰæt] No I can't

Ml and Context

It's a lot of work, isn't it?

This one's coming through this one, isn't it?
OK?
Get the pink one down and we'll wreck it apart too.
(The pink bug is on the dresser.)

Yeah. The pink one.

No, we're gonna have a race.
You have to try and put them back together too.

You did - You did them this morning.
8. [ajnow hædə]
   I know how to
   And there's the eyes.
   OK?
   (Ml empties some more parts out of the box.)

9. [hæp mipvə bæk' ægeo]
   Help me put it back, OK?

10. [hæp' bæk' ægin]
    Help it back again.

11. [pv? r? ba]
    Put in box.
    Good. (Dl tries to attach a leg.)
    Is that right?

12. [njʌ?]
    Yeah

13. [中级 diʌ? du ʰæ]
    Y-you just do that.
    That's not how it goes, is it?
    Think it goes like that.
    (Ml fixes the leg.)
    Ok it's a race. You've gotta hurry.
    Oh good.
    There we are.
    (Ml finished making the blue cootie bug.)
    There's one.

14. [θej mämə]
    See mama?

15. [ʔaj hiə mekəmikejkʰ]
    I here make < >
    (Dl tries to make the green bug.)
    That one's a hard one, isn't it?
    There.
    (Some parts of the green bug are broken so Ml takes it from Dl and adds a leg.)
    And you can put the -
    You can put the other ones in, OK?
Dl

16. [ək¹hæt⁴muw 'bæt]
I can't move it back.

17. Yeah

18. [amahaigowšm]
< >

19. [nowjudyuánawam kʰə aj
No you do another one 'cos I
də nowa³ə bjuwdə³³]
don't know how to build it.

20. [waʂ]
Watch!

21. [aj 'gãduwi³³]
I can't do it.

22. [ow a]
< >

Ml and Context

(Dl tries to fit in a leg but it falls out.)

Well maybe you'd like to do the pink one, would you?

(Dl starts the pink one.)
Good.
(Dl attaches the body pieces together.)
Good.

Well I'll put one in but you did them this morning so you can do the other one, OK?

(Dl tries to fit a leg in but it falls out.)

Oh, what's - you did it this morning.
OK, I'll do this one.
(Ml takes the pink bug from Dl.)
Then you can play with the bugs, OK?

You think you could put his eyes on?
Find his eyes.
23. [f打听 aix]

Find his eyes?

24. [wEc: IPAjaiX]

Where's my eyes?

25. [wEpIaiX]

Where some eyes?

Uh-huh.
We're - we're missing a leg, aren't we?

Oh that doesn't matter.
This one - this leg here's broken so we can't use it.

OK he need - this - this bee needs some eyes and he needs some antennas.
And he needs a tongue.
(D2 is aged 4 years, 5 months, and 5 days. He and M2 are seated in the middle of the living room floor. The toys on the floor and on the nearby coffee table are: a box of tinker toys, a Fisher Price puzzle board, a box of cars and trucks, Fisher Price people, Sesame Street finger puppets, and a toy barn filled with plastic animals. The observer is seated on a chair. D2 has just picked up a toy plane.)

**D2**

1. [æ gowap' diŋ]
   I go up this

2. [æ gow dɛːd]  
   I go down

3. [aj pʰvdaɪdæː']
   I put like that

4. [ŋ diŋ vɛj]
   And this plane

5. ['?fajmə ŋwak']
   A fireman truck

6. ['aj'hio]
   Right here

7. [waj hiŋ]
   Right here

8. [waʃisə 'nawən]
   What's this another one?

**M2 and Context**

Uh-huh  
(D2 is making the plane fly up and down.)

Well where's the fireman in it?

What's that?  
(M2 points to toy fire engine.)

(D2 makes a siren noise.)

There's one hat.
I guess we've lost the other hat, huh?
9. Yeah

10. [n dɪswɔm bʷɔwkəŋ]
    And this one broken (D2 can't fit the blue hat on his man, so M2 does it for him.)

11. [mɑ̃ zis]
    What's this? See it goes on that one.

12. Yeah. See the -
    It's a sailor hat that goes on there like that.
    See?
    You guys snapped all the hats off.

13. Yeah. (D2 takes a red hat.)

14. Yeah (D2 takes a red hat.)
    Who's that go to?
    Is that that one?
    Yeah that's that one.
    (M2 puts the red hat on another man.)
    There.
    See?

15. Yeah (The hat slipped off.)
    Mummy'll have to fix them, won't she?

16. OK (The hat slipped off.)
    Glue them all back on for you.

    OK way you go.
    You play with the fireman (D2 takes the fire truck.)
D2

17. [gəpʰv disiʷ]
   Gonna put this here

18. No

19. [dz?]
   This

20. [ʻan də]
   On the-

21. [ʻʌpʰ də]
   Up the -

22. [ʔdə ʻbamen]
   On the bottom

23. See -

24. [jɛ̃ ə dɪə]<
   (>)

25. [ʔʰ kɛʔ ʰis]
   I get this.

M2 and Context

Uh-huh.
Where's the fire?
(M2 moves the barn closer to D2)
The barn on fire?
No

Where's the fire then?

On the bottom
You gotta get all the animals out then.

What is that?
(M2 points to the hose that D2 has detached from the fire truck.)