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EARLY LANGUAGE DEVELOPMENT AS A FUNCTION OF
ACTIVE RESPONSE AND STIMULUS REDUNDANCY

DISSERTATION
Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By
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ACKNOWLEDGMENTS

I would especially like to thank my adviser, Herbert E. Rie, Ph.D., for providing ideas, advice, and encouragement throughout the course of this study. Malcolm M. Helper, Ph.D., and Fred L. Damarin, Ph.D., gave of their time to serve on my committee and made many helpful suggestions. Ms. Dorothy Eldridge, Joseph Burton, M.D., and the staff of the Health Assessment Clinic at Children's Hospital, Columbus, Ohio, helped greatly in the identification and recruitment of subjects. Ms. Dorothea Rienstra and Ms. Deborah Henry did the typing of letters and instructions to the subjects' mothers as well as taking many phone messages. James R. Erickson, Ph.D., contributed advice concerning appropriate statistical procedures and Mr. Madhukar Golhar of the Instruction and Research Computer Center, Ohio State University, furnished statistical guidance, selected the necessary computer programs, and patiently checked before each run to see if the cards were punched and arranged correctly. The Ruth Lyons Christmas Fund and Children's Hospital, Columbus, Ohio, supplied funds for the purchase of the materials used in this study.
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INTRODUCTION

In recent years, interest in the disadvantaged child has burgeoned. Besides studying the effects of a deprived environment on the development of the child, concerned professionals have sought to develop preventive and ameliorative programs in various areas. The area of early cognitive stimulation is one which has received particular attention (see Caldwell, 1971, for a discussion of the determinants of the current interest in this area). The present study falls within the mainstream of this current interest since it is concerned with a crucial aspect of cognitive development, namely, language development. While investigating the effects of active response and stimulus redundancy on the language development of young (18-21 months), disadvantaged, black children, it also explores the efficacy of using each mother as the minimally-supervised source of systematic and focused stimulation for her child. The modes of stimulation chosen are story-reading and teaching the names of pictured objects.

Chapter I sets the context of the study by presenting literature concerning the significance of language,
the use of mothers as teachers, and the basis for choice of subjects and activities. Chapter II outlines the problems under investigation through literature related to the two independent variables of stimulus redundancy and active response. Chapter III presents the design and hypotheses while chapter IV sets forth the method. The results and discussion are in chapters V and VI, respectively.
CHAPTER I

CONTEXT

The Significance of Language

Regardless of theoretical differences, it is generally agreed that the two major functions of language are communication with others and facilitation of thinking and action for the individual (Carroll, 1964). Many authors have written about the role of language in cognitive development and only a few will be cited here as examples. Bruner (1964) has distinguished three systems of processing information by which human beings construct models of their world. These modes are through action (enactive representation), through imagery (iconic representation), and through language (symbolic representation). He presents evidence showing the limitations of enactive and iconic representation for processing information and demonstrates the superiority of symbolic representation. Symbolic representation brings the power to deal with the nonpresent, to transform as well as represent experience. Planning, long-range problem solving, integration of information, and delay of immediate gratification become possible when an
individual reaches the level of symbolic representation through development of internalized language. Luria (1961) has also discussed the importance of language and its relation to the regulation of behavior. He traces the development of speech in the child from the time when it exerts no control over behavior to the time when the child develops internal speech. Internal speech, he points out, makes possible verbal analysis of situations, abstraction and generalization, and the use of verbally-formulated rules. He states that the abbreviated internal speech, which is an invariable part of thought process, is a characteristic of the development of almost all higher forms of mental activity. Along the same line, Jensen (1967) brings out the importance of verbal mediation in problem solving and says, "A child who for any reason does not attain the stage of spontaneous verbal mediation will be mentally retarded in a functional sense (p. 130)."

Further evidence of the importance of language is supplied by studies which suggest that early language behavior may be helpful in predicting later intellectual functioning. More than three decades ago, Anderson (1939) administered a wide range of items to 91 infants from homes of high socio-economic status in order to see which types of items best predicted their Stanford-Binet
I.Q. at age five. His results led him to say,

Early language development (18-24 months) appears to be more closely related to later intelligence test scores than any other grouping of tests. A tentative conclusion may be drawn, namely that the best indication of intelligence at 18 and 24 months of age is development in the use and understanding of language (p. 205)."

Catalano and McCarthy (1954) used the Stanford-Binet, Form L to test 23 children aged 36 to 54 months. These were children who had had recordings made of their infant vocalizations when they were in an institution at the age of six to 18 months. Despite the fact that this was a small sample with an I.Q. range of 57 to 102 and a mean of only 74.7, the investigators found a positive correlation between the measures of infant speech and later I.Q. More recently, Bayley (1967) found that an item cluster from her California First Year Mental Scale composed principally of vocalizations correlated significantly with girls' (but not boys') later intelligence. The correlation increased with age and was higher in relation to verbal than performance scores.

Many investigators have been concerned with subcultural differences in language use and the possible impact of these differences. Certain articles on this topic will be cited here in order to shed additional
light on the important role language plays in human life. Bereiter and Engelmann (1966) make a case for treating cultural deprivation as synonymous with language deprivation. Their work with disadvantaged Negro preschool children has led them to the conclusion that such children fail to master the cognitive uses of language which are of primary importance for success in school. That is, although the language of these children is adequate for maintaining social relationships and for meeting their social and material needs, they do not learn how to use language for obtaining and transmitting information, controlling their behavior, and carrying on verbal reasoning. Two special weaknesses noted in the language development of these "lower-class" children were: (1) "... the tendency to treat sentences as 'giant words' that cannot be taken apart and recombined." and (2) "... a failure to master the use of structural words and inflections which are necessary for the expression and manipulation of logical relationships (Bereiter and Engelmann, 1966, p. 42)." These authors believe that inadequate language development is primarily responsible for the failure of so many disadvantaged children to perform satisfactorily in the school setting.

Bernstein (1961, 1964) has identified two distinct
forms of language use which he calls elaborated and restricted. The restricted code is condensed, having a highly predictable class of content. It is characterized by rigidity of syntax, restricted use of the structural possibilities for sentence organization, and highly predictable speech elements. Although the restricted code is suitable for maintaining social relationships and sharing familiar experiences, it is stereotyped, lacking in the specificity needed for precise conceptualization, and inadequate for analysis, reasoning, and expression of original thoughts. In contrast, the elaborated code is highly individual, featuring clarity, specificity, and precision. It facilitates verbal elaboration and permits a wide range of expression. According to Bernstein, the "middle class" typically uses both kinds of codes while people from the "lower classes" are often limited to the use of a restricted code. As a consequence, people in the "lower classes" who are so limited are unable to operate at higher conceptual and logical levels. They are trapped by the restrictions of their mode of language use. In broad terms, Bernstein believes that the experience of speakers is transformed by what is made relevant or significant by their speech systems. He hypothesizes numerous and far-reaching effects of the exclusive use
of a restricted code of language. In his view, success in school is contingent upon a child possessing or at least being oriented toward the elaborated type of code.

The work of Hess and Shipman (1965) draws heavily from Bernstein and attempts to test some of his hypotheses. These investigators argue that "... the structure of the social system and the structure of the family shape communication and language and that language shapes thought and cognitive styles of problem-solving (p. 520)." Among the related points that they make is that the ways a parent has of communicating with and controlling his child can affect various dimensions of his cognitive behavior, such as the tendency to reach solutions impulsively rather than reflectively. In order to test some of their hypotheses, Hess and Shipman (1965) used a group of 163 Negro mothers and their 4-year-old children drawn from four different social status levels ranging from college-educated professional, executive, and managerial occupational levels to unskilled or semiskilled occupational levels, with fathers absent and families supported by public assistance. The mothers were interviewed, tested, and also participated in an interaction session with their child in which they were asked to teach the child three simple tasks. Among other things, they found that "middle-class" mothers, in
contrast with "lower-class" mothers did appear to make use of a more elaborated verbal code such as Bernstein (1961, 1964) described. Their results also tended to confirm the hypothesis that "lower-class" children are more impulsive in their approach to categorization and problem-solving than their "middle-class" counterparts. That is, they are less likely to carefully analyze a situation and reflect over alternative solutions.

It seems clear even from the limited references cited in this section that language is a powerful tool and that an individual's level of language development can have far-reaching effects. Therefore, it appears that studies like the present one which attempt to investigate some of the variables which affect language development are highly desirable, if not essential.

Mothers as Teachers

In recent years there has been a great deal of interest in developing programs of early cognitive stimulation aimed primarily at children from environments found or assumed to be depriving in some way (Caldwell, 1971). Many different approaches have been taken. One significant trend is the attempt to reach the parents of young children and involve them directly in the stimulation and education of their own children (Weber, 1970).
Several investigators have conducted programs using mothers as teachers and have reported their experiences. Weikart and Lambie (1968) questioned the secondary role played by the mother in many preschool education programs. They selected 35 mothers (both Negro and white) with four-year-old children on the basis of a low score on a cultural deprivation scale. Four certified teachers handled nine families each. The teachers paid a 1½ hour visit to each home once a week for a period of 12 weeks. The visits were devoted to direct tutoring of the child, active involvement and training of the mothers, and presentation of new materials so the mother could continue working with her child during the week. The five basic areas covered were manipulation activities, dramatic play, perceptual discrimination, classification, and language. Of the total number of possible visits, 92% were completed. The experimental group had a significantly greater mean change score than a comparable control group on the Stanford-Binet Intelligence Scale, Form LM. They also showed a greater gain than the control group on the Peabody Picture Vocabulary Test although the gain was not statistically significant. As a whole, the mothers were found to be cooperative and enthusiastic and the investigators felt that they had demonstrated the feasibility of this style of
intervention, i.e., the direct involvement of mothers.

The same authors subsequently started a program similar to the one described above using mothers and their infant children (Lambie and Weikart, 1970). The infants were phased into the project at three, seven, and eleven months of age to provide information on program impact as a function of entry age. Programming was flexible and individualized for each mother-child dyad. Data from the six-month pilot study led the authors to state that "... there is every reason to believe that home teaching as a method of altering the growth pattern of disadvantaged infants is worth an intensive trial (Lambie and Weikart, 1970, p. 378)."

Another intervention program involving mothers and their infants was developed by Karnes and his collaborators (Karnes and Badger, 1969; Karnes, Teska, Hodgins, and Badger, 1970). Some of the reasons they cited for using mothers as teachers were that it would extend the number of children reached by limited professional staff with minimal budget; it would increase the mothers' awareness of the educational needs of their infants; it would positively affect the educational prognosis of other children in the family; it would help the mother develop a sense of dignity and worth. Results with 20 infants between the ages of twelve and twenty-four
months from economically depressed neighborhoods were encouraging. Mothers were paid $3.00 to attend monthly 2-hour meetings and transportation was provided. The meetings were divided between child-centered and mother-centered activities. Educational toys and materials were made by or presented to the mothers to use with their infants. Staff members made monthly home visits. At the end of the 15-month program, the 15 infants who had completed it performed significantly better than two control groups on the Stanford-Binet Intelligence Scale, Form L-M and the Illinois Test of Psycholinguistic Abilities. Karnes and Badger (1969) were led to conclude that, "Since at-home intervention by mothers can be budgeted at a fraction of the cost of tutorial intervention, the direction for further research in preventive programs of very early intervention seems clear (p. 934)."

Gordon (1969) wished to find out if the use of parent educators would increase the mother's competence and sense of personal worth. He used disadvantaged women who were high school graduates to teach mothers how to stimulate their infants (all the infants were under two years of age). The instructors visited each home about once a week. Results obtained thus far have been encouraging. The infants in the experimental group
performed better on the training tasks than a control group and were superior to the control group on the Griffiths Scale.

A study by Levenstein (1970) was concerned with "low-income" children aged 20 to 43 months. The seven-month program involved 33 mother-child dyads who were visited an average of 32.4 times each by a research social case worker who was called a Toy Demonstrator. Her role was to present toys and books and stimulate verbally-oriented play in the dyad by serving as a model for the mother. The mothers were encouraged to play and read with the child between visits. The attitude of the mothers involved was found to be generally "cooperative" and "responsible." Both the experimental group and two types of control groups were given the Cattell or Stanford-Binet Intelligence Scales and the Peabody Picture Vocabulary Test before and after the seven-month program. Children in the experimental group made a significantly greater mean gain on the Cattell and Binet than the children in either control group. Their mean gain on the Peabody was significantly greater than that of one of the control groups but not the other. Levenstein (1970) points out that "... on the basis of observation of some extremely disorganized low-income families, educators may be too ready to assume that all
low-income families lack the capacity to provide the elements essential to very young children's learning (p. 427)." She suggests that a program such as hers, using mothers, can be replicated at relatively modest expense and may well make a small but important contribution to the intactness of the low-income family.

The authors of the studies mentioned above are optimistic about the feasibility and benefits of using mothers to teach and stimulate their infants and young children. At least one investigator in the field of early cognitive stimulation who conducted an infant-centered tutoring program not involving mothers (see Schaefer, 1969) has reportedly become firmly convinced of "... the futility of trying to effect educational changes without involving parents (Caldwell, 1971, p. 318)." Thus, it appears that further trial and investigation of the technique of using mothers as teachers and stimulators of their own infants and young children is not only fully warranted, but even necessary.

Basis for Choice of Subjects and Activities

Meier, Segner, and Grueter (1970) have argued that programming aimed toward the prevention of cognitive disability can be optimally effective only if it is initiated very early. Irwin (1960) reported positive
results of story reading on language development after 17 months of age, but not before. Several studies have indicated that it is around the age of 18 months that the developmental curve representing disadvantaged groups begins to drop below that of their "middle-class" counterparts (Deutsch, 1968; Gilliland, 1949; Knobloch and Pasamanick, 1953). Therefore, subjects in the 18 to 21-month age range were selected for the present study because this appeared to be the lowest age at which the proposed experimental interventions might be effective. Black disadvantaged children were used because they were more readily available than any other disadvantaged group and because a racially homogeneous sample was desired.

The choice of activities and materials for purposes of stimulating language development was made on both empirical and practical grounds. Since at least two studies have shown that the reading of stories has a beneficial effect on language development in young children (Fodor, 1967; Irwin, 1960), books seemed a logical choice. Sticker posters and colored pictures were added in order to make the array of materials a bit more impressive in the mothers' eyes. The books with human characters all included some black people in the illustrations since it was felt that these would be more
acceptable to black parents than books with white characters exclusively. Due to the limited funds available for this study, it was necessary to use relatively inexpensive materials. However, within the above limits, every effort was made to select things which would appeal to the age range involved. This was done largely on an intuitive basis.
CHAPTER II

PROBLEM

Stimulus Redundancy

Cazden (1966), in a review of subcultural differences in child language, raised some provocative questions about factors which might influence a child's language development. One such question concerned the relative value of variety as opposed to repetition in the language stimulation available to the child. As she puts it, "The question at issue is whether increased variety, often termed 'richness', adds anything to increased quantity alone (Cazden, 1966, p. 197)." She later added,

> In contrast to variety are well-learned routines. These may include sentences such as I DON'T KNOW; they may also include bits of nursery rhymes and songs and, perhaps most important of all, phrases from books read to the child many times (p. 198).

The search for theory and empirical evidence bearing on this question inevitably led to a consideration of the reaction to and need for novelty in humans and, especially, in infants and children. Obviously, novelty and variety are kindred concepts and a lack of variety
or novelty leads to redundancy in stimulation. Hunt (1963, 1970) has repeatedly tackled the problem of determining the interaction of novelty and familiarity in enhancing attentional preference. He has theorized that "... once children have been exposed to a given pattern of stimulation enough times to make it familiar, the emerging recognition of the pattern brings pleasure that motivates an effort to retain or re-elicit the pattern" and that "... after a pattern has continued to be familiar for a time, it is variation in that pattern that brings pleasure and the effort to find that variation in either the child's own activities or in external stimulation (1963, p. 273)." Support for this assertion has come from several sources.

Greenberg, Uzgiris, and Hunt (1970) placed dangling visual patterns over the bassinets (provided by the experimenters) of a group of month-old infants. At the ages of two, 2.5, and three months, these infants were presented with an unfamiliar dangling visual pattern in addition to the familiar pattern and the amount of time spent looking at each was recorded. In the first test at two months of age, following four weeks of exposure to their familiar pattern, the infants as a group looked significantly longer at the familiar pattern than at the unfamiliar one. However, in the second and third tests,
they looked longer at the unfamiliar pattern. As Greenberg et al. (1970) state, "These results clearly support the hypothesis of attentional preference for a pattern made recognitively familiar through repeated perceptual encounters developing before those perceptual encounters lead to attentional preference for an unfamiliar pattern (p. 129)."

Friedlander's (1968, 1970) work with auditory stimuli rather than visual lends further support to the Hunt hypothesis and has direct bearing on the present study. The data in Friedlander's studies were collected through the use of an automated "toy" attached to the crib or playpen of his infant subjects. He described this apparatus as follows:

This toy, named PLAYTEST, consists of a pair of large response switches the child can operate at will, a loudspeaker, an electrical control and response recording unit, and a stereo tape player with a pre-programmed selection of two-channel audio tapes. Whenever the baby operates either switch, he automatically makes a record of the frequency and duration of his responses, and simultaneously he turns on one channel or the other of the audio tape. The two channels are programmed separately with different stimulus materials which are selected to contain whatever variables are under investigation. The record of the baby's responses on the two switches over an extended period gives an indication of his listening discrimination and listening preferences. The system operates and is ready for the baby to play at all times whenever he is awake in the crib or playpen, and he can listen to either channel
whenever he wants to for as long as he plays with the switches (1970, p. 15-16).

Using the PLAYTEST, Friedlander (1968) programmed one channel with a long sample selected from a recording of his infant subject's family engaged in a spirited conversation. This repeated itself every 240 seconds and was labeled the low-redundancy condition. The other channel offered a 20-second sample selected from the 240-second sample and was labeled the high-redundancy condition. Care was taken to try to achieve approximately the same balance of voices, volume, and laughter in both samples. The infant was 11 months of age when he first became involved in a series of studies by Friedlander and 16 months at the end, though his age at the time of this specific study is not given. After initial sessions with high listening time and a generous sampling of both feedbacks, the baby settled into a pattern of listening almost exclusively to the short high-redundancy message. There then followed a series of low output sessions with divided responding. After this, the baby showed new and almost total preference for the longer, low-redundancy conversation. The baby repeated this crossover pattern in a similar study with new tapes from another family conversation (Friedlander, 1968).

Wisdom and Friedlander (1971) did a similar study
using 12 infants aged nine to 18 months from graduate student homes. One channel of PLAYTEST was programmed with a 20-second segment of a children's story (i.e., it repeated every 20 seconds) which was called the high redundancy, low information selection. The other channel had a 140-second story segment which was called the low redundancy, high information selection. Seven babies showed unambiguously significant preference for the less redundant, higher information story sequence and three others showed a marginally significant preference for the more informational story sequence. Moreover, a crossover effect (similar to that mentioned above) from initial preference for the high redundancy, low information story segment was clearly observed in six of the 12 infants. In writing about these results, Friedlander (1970), says, "It does not seem incorrect to infer that the way these preferences shift indicates something important about the infants' efforts to establish optimum conditions for language listening and language learning (p. 48)."

Although Hunt's hypothesis (hereafter referred to as the recognition familiarity hypothesis) that repeated auditory and visual encounters separated in time appear to lead first to attentional preference for the pattern becoming recognitively familiar, and only later to
attentional preference for what is unfamiliar has received empirical support, the issue of whether the shift in preference is a matter of maturation or of personal interaction with the patterns remains unsettled (Greenberg et al., 1970). In other words, it may be that such a shift does not take place after a certain age or it may be that such a shift exists in a person's interaction with every pattern, regardless of age. Even adults may prefer what is becoming recognitively familiar, although the exposure required for recognition may be quite brief, and the shift to what is unfamiliar and novel may come very rapidly. A perusal of relevant literature still leaves the issue in doubt. Friedlander (1970) found no age differences in his aforementioned results up to 18 months of age (he has not gone beyond that age). Lewis, Goldberg, and Campbell (1969) studied the developmental course of habituation to visual inputs in the first three years of life. Their results suggest that, in general, response decrement occurs to a redundant signal and that this response decrement follows a lawful developmental pattern within the first three years of life, with the youngest infants showing significantly less decrement than older infants. Mendel and Maddi (unpublished study) sought to determine the influence of degree of novelty on choice of play objects in
three to five-year old children. Their experimental group was permitted to play with an array of eight small toys for eight minutes and were then shown five additional arrays. One of the five arrays was identical to that encountered during the habituation phase while the others contained different proportions of habituated toys to those not previously encountered in the experiment. A control group had no habituation period but was asked to choose among the five arrays. Taken together, arrays which were 25% to 75% novel were chosen more frequently by the experimental than the control group. Arrays with 0% and 100% novelty, taken together, were chosen with less frequency. Mendel and Maddi conclude that an intermediate degree of novelty is apparently more effective in eliciting choice or investigatory behavior. Berlyne (1957) seated adult subjects in a darkened room facing a tachistoscope. Every time a subject pressed a lever, a figure became visible for 0.14 second. The subject was free to expose himself to as many glimpses of a particular figure as he liked. There were three series, each containing figures with differing degrees of redundancy. In all cases, figures with less redundancy attracted more investigatory responses, and the differences were significant throughout.
One experiment was designed to measure learning as a function of verbal contextual redundancy and variety. Razran (1961) used two groups of 20-month-old children and showed them a doll 1500 times in the course of several months. For one group, each presentation of the doll was always accompanied by one of three utterances: "Here is the doll," "Take the doll," and "Give me the doll." In the other group, one of 50 different utterances accompanied each presentation of the doll. The treatment of the two groups was identical except that one group experienced a much greater variety of verbal context in which the word "doll" occurred. When the children were tested for understanding of the word "doll" in terms of their ability to pick one out from a group of objects, the group which experienced greater verbal contextual variety was far superior.

A question which emerged from a consideration of all of the above is whether or not the degree of visual and auditory stimulus redundancy a young child is exposed to makes a difference in his rate of language development. This, then, is one of the two major problems with which this study is concerned.

Active Response

A question which has received relatively little
attention in the literature is whether or not active responding in addition to passive reception of auditory and visual stimuli results in more effective language learning than passive reception alone. John and Goldstein (1964) have maintained that receptive experience is not enough. They contend that the process of generalization and discrimination involved in learning the meanings of more abstract words does not come about simply through receptive exposure to many examples but through "... active participation with a more verbally mature individual (p. 273)." They feel that there is less dialogue in "lower-class" than in "middle-class" homes and, hence, less chance for corrective feedback. Cazden (1966) cites evidence that children from lower-status groups watch as much TV as high-status groups and wonders why this extra language stimulation is not more beneficial. She suggests that the critical difference may be between passive listening to a monologue versus active participation in a dialogue. Piaget, in his papers on educational methods, has generally emphasized the necessity of active interaction between the learner and the environment (Flavell, 1963). Dewey (1935) lent early support to the general notion that active participation results in more effective learning than passive reception when he wrote the following:
I believe that the active side precedes the passive in the development of child-nature; that expression comes before conscious impression; that the muscular development precedes the sensory; that movements come before conscious sensations; I believe that consciousness is essentially motor or impulsive; that conscious states tend to project themselves in action. I believe that the neglect of this principle is the cause of a large part of the waste of time and strength in school work. The child is thrown into a passive, receptive, or absorbing attitude. The conditions are such that he is not permitted to follow the law of his nature; the result is friction and waste (p. 13).

Gray (1966), in describing activities to use with "lower-class" preschool children emphasized that telling and reading stories should never be a passive experience for the child. She also stated, "Evidence seems to suggest that it is not so much by simply listening to the speech of others that the child acquires verbal skills, as it is by his attempts to respond to their verbal productions and his being rewarded for these efforts (p. 28)."

Thus, most of the authors who have considered the possible effect of active response on language development seem to feel, perhaps intuitively, that it is necessary or, at least, desirable to encourage such active response. The implication seems to be that a state of passive reception is to be avoided because it is, at best, less effective and, at worst, ineffective in
producing language learning. The results of an experiment by Mann and Baer (1971) have definite bearing on this issue. Using four-year-old subjects, these experimenters told the children a six-syllable nonsense name for each of four nonsense objects. A prompt-and-fade technique was used and the subjects were rewarded (with praise and poker chips which could be traded for toys) for pointing to the correct object when the experimenter said its nonsense name. At no time did the subjects pronounce the nonsense names. There was one 20-minute training session each day, four days a week, for two weeks. At the end of that time, the subjects' articulation of the nonsense names they had been exposed to as well as their articulation of a matched group of control nonsense words they had never before heard was tested. This was done by asking them to repeat the words after the experimenter. In general, each of the experimental words was more accurately articulated than its matched control word. This experiment illustrates that at least one aspect of language development (viz., articulation) can be positively affected in the absence of any active verbal response.

A consideration of the literature cited in this section makes it clear that the issue of whether or not active response facilitates language learning requires
further investigation. This is the second major problem with which this study is concerned.
CHAPTER III
DESIGN AND HYPOTHESES

Design

In order to investigate the effect of stimulus redundancy and active response on early language development, a two-by-two design was used resulting in four experimental groups plus the necessary control group. One experimental group, known as the high redundancy-active group (HR-A), received a language stimulation program involving a great deal of repetition of visual and auditory stimuli. In addition, this group was continually encouraged to make active responses to the stimuli in the form of pointing, naming, and repeating. Another experimental group, known as the high redundancy-passive group (HR-P), received the same repetitious language stimulation program as the HR-A group, but was not encouraged to make any sort of active response to the stimuli. A third experimental group, called the low redundancy-active group (LR-A) was exposed to a language stimulation program offering a relatively great amount of variety and a relatively small amount of repetition. Like the HR-A group
previously described, this LR-A group was continually encouraged to make active responses to the stimuli such as pointing, naming, and repeating. The fourth experimental group was the low redundancy-passive group (LR-P). This group received the same language stimulation program as the LR-A group, one featuring a relatively great amount of variety and relatively little repetition. However, in contrast to the LR-A group, the LR-P group was not encouraged to make any sort of active response to the stimuli presented. The control group was not exposed to any sort of language stimulation program.

All subjects were tested with the Houston Test for Language Development at the beginning and end of an eight-week period. Subjects in the experimental groups received an additional specific vocabulary test at the end consisting of 15 words read and illustrated in all the language stimulation programs and 15 words of comparable difficulty which were not included in any of the language stimulation programs.

Hypotheses

In the statement of hypotheses to follow, any reference to "language development" should be taken to mean language development as measured by the Houston Test for
Language Development and by the test of specific vocabulary acquired, which was devised for this study, unless otherwise specified. The following hypotheses were tested.

Hypothesis #1: All four experimental groups would make significantly greater gains in language development as measured by the Houston Test than the control group.

This hypothesis was justified on the basis of the studies by Irwin (1960) and Fodor (1967) which found that children who were read stories and informally taught the names of pictured objects showed greater gains in language development as measured by various means than children who did not receive such stimulation.

Hypothesis #2: The low redundancy-active (LR-A) experimental group would make significantly greater gains in language development than any of the other three experimental groups.

Besides the provision for continual encouragement of active responses, the LR-A experimental condition was thought to offer a chance for cognitive familiarity to be established without carrying the redundancy to the point where the need for novelty would interfere with attentional processes. None of the other experimental
conditions offered both these postulated advantages to the infant subjects. Hence, the second hypothesis.

Hypothesis #3: The high redundancy-passive (HR-P) experimental group would gain significantly less in language development than any of the other three experimental groups.

This HR-P experimental condition did not provide the postulated advantage of continual encouragement of active responses. In addition, the relatively high level of redundancy in the language stimulation program was expected to interfere with attentional processes by bringing about a need for novelty. The third hypothesis was therefore justified on the basis that this was the only experimental group combining both of these postulated disadvantages.

Hypothesis #4: There would be no significant difference in language development gains between the low redundancy-passive (LR-P) experimental group and the high redundancy-active (HR-A) experimental group.

Since there was no evidence in the literature concerning the relative potency of the redundancy variable and the active response variable, it was necessary to hypothesize that there would be no significant difference between the LR-P group and the HR-A group, as was
done in the fourth hypothesis.

Hypothesis #5: Each experimental group would show greater knowledge of words selected from the experimental materials ("book words") than of comparable words not included in the experimental materials ("non-book words").

This was largely an intuitive assumption since no evidence was uncovered concerning the effect of language programs similar to the ones in this study on the acquisition of specific vocabulary.
CHAPTER IV

METHOD

Subjects

The subjects were "lower-class" black children ranging in age from 18 months, no days to 21 months, 28 days at the time of initial evaluation. Names of potential subjects were obtained from records of emergency room visits and clinic visits to Children's Hospital, Columbus, Ohio. The mothers were then approached, either in person when they visited the clinic or by telephone. Although an exact record of the number of refusals was not kept, the vast majority of mothers contacted expressed an interest in participating in the study or "language program," as it was called (see Appendix A for a more or less verbatim account of the explanation initially given to mothers of potential subjects). The program was specifically identified as a project of Children's Hospital and all but three of the 80 children initially tested had paid one or more visits to one of the out-patient clinics at Children's Hospital.

In order to be eligible for inclusion in the study, the child had to be black, 18 to 21 months of age, and
"lower-class" in the sense that a rating of his family, using Hollingshead's (1957) Two Factor Index of Social Position, placed the family in either Social Class IV or V of Hollingshead's five-class classification system. Even if a child met the above criteria, he was excluded if his score on the Houston Test for Language Development was at least two to three months above age level and if the mother indicated under questioning that she read to the child at least three times a week. Only six children were excluded on this basis and they are herein referred to as the "Too Advanced" (T.A.) group. Children who were suspected of being congenital retardates on the basis of appearance and general lack of age-appropriate development were also excluded. Two such children were encountered.

Eighty children were given the Houston Test for Language Development, which was administered to each potential subject at the time of the first home visit. Of these, the six members of the T.A. group and the two retardates were excluded from the study and 19 others subsequently dropped out for reasons which will be discussed later. Thus, the final sample consisted of 53 children distributed as follows (see Table 1): control group, N=13; HR-A, N=9; HR-P, N=11; LR-A, N=9; LR-P, N=11. As indicated in Table 1, there are more girls
TABLE 1

COMPOSITION OF GROUPS

<table>
<thead>
<tr>
<th>Groups</th>
<th># Started</th>
<th># Drop-outs</th>
<th>Final N</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR-A</td>
<td>17</td>
<td>8</td>
<td>9</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>HR-P</td>
<td>14</td>
<td>3</td>
<td>11</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>LR-A</td>
<td>14</td>
<td>5</td>
<td>9</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>LR-P</td>
<td>14</td>
<td>3</td>
<td>11</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Control</td>
<td>13</td>
<td>0</td>
<td>13</td>
<td>10</td>
<td>3</td>
</tr>
</tbody>
</table>

Drop-outs -- -- -- 14 5
T.A.'s -- -- -- 2 4
Retardates -- -- -- 2 0
Totals 72 19 53 43 37

than boys in each of the experimental groups. This is largely due to the fact that many more boys than girls dropped out. The fact that the control group, on the other hand, contains so many more boys than girls was inadvertent. However, the lack of balance between boys and girls in the groups does not appear to be a serious problem since no significant sex differences emerged on any of the variables related to this study, i.e., age; initial language deficit; mother's I.Q.; home stimulation score; and gain in language development.
Two types of data were collected for this study. One type included assessments of the subject, his mother, and his environment as they existed at the time he entered the program. These initially-assessed characteristics were: subject's age; subject's initial language deficit (obtained by subtracting his age equivalent score on the Houston Test for Language Development from his chronological age); mother's I.Q. as measured by the Peabody Picture Vocabulary Test (PPVT); and stimulation in the home as assessed through use of the Inventory for Home Stimulation (Caldwell, 1970). The other type of data collected involved measures of change as a result of participation in the program. These data on change characteristics will be considered in a later chapter. Table 2 presents a comparison of all the groups (including Drop-Outs and T.A.'s where the data were available) with respect to the initial characteristics listed above. No home stimulation score was obtained for five of the Drop-Outs who withdrew from the study before the second home visit. One mother in the Drop-Out group was not given the PPVT because she was not present during the initial home visit. The only data collected on the T.A.'s were the age and the Houston Test score. A one-way analysis of variance using Duncan's New Multiple Range Test (Winer, 1971) was
### Table 2

**Initial Characteristics of Groups**

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Mean Age</th>
<th>S.D.</th>
<th>Mean Initial Deficit</th>
<th>S.D.</th>
<th>Mothers' Mean I.Q.</th>
<th>S.D.</th>
<th>Mean Stim Score</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR-P</td>
<td>11</td>
<td>19.015</td>
<td>1.075</td>
<td>-3.321</td>
<td>2.7129</td>
<td>87.727</td>
<td>19.4632</td>
<td>27.455</td>
<td>5.2984</td>
</tr>
<tr>
<td>LR-A</td>
<td>9</td>
<td>19.170</td>
<td>0.9232</td>
<td>-2.283</td>
<td>2.9762</td>
<td>82.889</td>
<td>13.3832</td>
<td>28.111</td>
<td>4.9609</td>
</tr>
<tr>
<td>T.A.'s</td>
<td>6</td>
<td>19.745</td>
<td>1.1855</td>
<td>3.462</td>
<td>1.9819</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

(N=18)
employed to check for significant differences among the groups. The Duncan Test, which may tend to be a bit lenient in some cases, indicated no significant differences among the experimental, control, and Drop-Out groups on any of the variables. The T.A.'s, naturally, had a significantly lower initial language deficit than any of the other groups, but were not significantly different in terms of age.

Tests and Instruments Employed

This study employed the Houston Test for Language Development (Crabtree, 1957, 1958) in order to measure change in level of general language development over an eight-week period. This test was designed to measure the development of language in children up to three years of age. According to the author, "An attempt was made to include at each age level, items that represented the various aspects of language, both from the broad classifications of reception, conceptualization, and expression, and the more specific categories of melody, rhythm, accent, gesture, articulation, vocabulary, grammatical usage, and dynamic content (Crabtree, 1958, p. 3)." On the average, the test took about an hour to administer. Appendix B presents the test items from each age level of the test.
One test was designed specifically for this study in order to compare subjects' knowledge of specific vocabulary contained in the experimental materials ("book words") with knowledge of comparable words not contained in the experimental materials ("non-book words"). In order to do this, 15 words were selected from the two illustrated children's books common to all the experimental groups. All fifteen words occurred both in the text and in at least one illustration. Illustrations of these 15 book words were then located in the plates of the Peabody Picture Vocabulary Test (PPVT). Each book word was matched with a non-book word illustrated in the same or an immediately adjacent plate of the PPVT. The assumption was that words illustrated in the same or adjacent PPVT plates were of a comparable level of difficulty. Administration of this test was the same as that of the PPVT. The examiner presented the child with a plate of four pictures, said the stimulus word, and asked the child to point to the picture that went with the word. The same plate was used for each matched pair of stimulus words, but the list of 15 book words was always done first, followed by the list of 15 non-book words. In some cases, two or more book words were illustrated in the same PPVT plate. When this happened, the original plate was used to test one
of these book words and its non-book counterpart. New plates with a different combination of adjacent pictures were made up for the rest. This was done in order to reduce the possibility of correct responses occurring due to a process of elimination, which might have happened with repeated use of the same plate. Appendix C shows the matched pairs of words used and the numbers of the PPVT plates from which they were taken.

For purposes of measuring the mothers' level of intelligence, the Peabody Picture Vocabulary Test (Dunn, 1965) was chosen. This test was designed to "... provide an estimate of a subject's verbal intelligence through measuring his hearing vocabulary (Dunn, 1965, p. 25)." The B Form of the PPVT was used with all mothers. Administration of this test consists of the examiner pronouncing a stimulus word and the subject indicating which of four pictures goes with the stimulus word pronounced.

The socio-economic class of each subject in this study was determined through use of the Two-Factor Index of Social Position (Hollingshead, 1957). In order to use this Index, one must know the occupation of the head of the household and the amount of formal education he has received. Each of these factors is then scaled according to Hollingshead's (1957) system of scores and
then the two are combined by weighting the individual scores obtained from the scale positions. The resulting combined score places the family being rated in one of five social classes, with Class I being the highest class and Class V being the lowest class.

In order to obtain an estimate of the stimulation available in each subject's home, the Inventory of Home Stimulation (STIM), designed for use with children from birth to three years of age, was used (Caldwell, 1970). The manual states that STIM was "... designed to sample certain aspects of the quantity and quality of social, emotional, and cognitive support available to a young child (birth to three years) within his home." and that "The primary objective that guided the development of this Inventory was the desire to assemble a set of items to assess those somewhat intangible qualities of person-person and person-object interaction which collectively comprise the infant's learning environment (Caldwell, 1970, p. 79)." About two-thirds of the STIM items require actual observation of mother-child behavior while the rest require interview data. All items on STIM receive binary scores—either yes or no. The score consists of the number of "yes's" received. The maximum score is 45. The STIM items are presented in Appendix D.
Procedure

The data collection for this study began with the first visit to a subject's home on November 9, 1971, and continued until post-testing of the final subject was completed on April 22, 1972. During much of this period, new subjects were continually recruited. Subjects were assigned to groups on a random basis and an attempt was made to keep the numbers in each group even at any given time. When a subject dropped out of the study, he was replaced as soon as possible. Due to time pressures, it was necessary to choose the end of April, 1972, as the deadline for completion of data collection. It was therefore impossible to replace subjects who dropped out less than eight weeks before this deadline.

Soon after the mother of a potential subject agreed to participate in the study, she received the first of three home visits. At this time, the child was given the Houston Test for Language Development in the mother's presence and the PPVT was administered to the mother. The explanation given to the mothers for the administration of the PPVT was that we wanted to see if there was any relationship between the child's level of language development and the mother's vocabulary. The PPVT was not identified to the mothers as an intelligence test, but was simply called a vocabulary test.
After the test administrations were completed, the mothers of subjects assigned to one of the four experimental groups were given the language stimulation materials along with instruction in and demonstration of their use. Written instructions were also provided (see Appendix E). The control group mothers received nothing.

The second home visit took place approximately a week after the first. The purpose of the second visit was to check for problems the mothers might be having with the program, offer encouragement, and take an inventory of home stimulation. During this visit the mothers (control group mothers excepted, of course) were asked to read to their children from that week's book in the experimenter's presence (in order to see if they were proceeding according to instructions) and any errors were corrected (generally speaking, errors in following the instructions were infrequent). The mothers' familiarity, or lack of it, with the experimental materials was revealed through indirect questions about the child's reactions to the things supplied (e.g., "Which picture did he like best?"). This provided a way of checking to see whether the mothers had actually used the materials. It was also possible to see evidence of use through the number of stickers on
the sticker poster (see below). In general, the mothers appeared to be quite candid about the number of days they missed working with their children and those who remained in the program for the full eight weeks left little doubt in the experimenter's mind that they had actually spent a substantial amount of time providing language stimulation for their children in the manner prescribed (see the "Results" chapter for an account of mothers' attitudes toward the study).

Each week, following the second home visit (which took place at the beginning of the second week of participation in the study), the mothers of subjects in the experimental groups received a mimeographed letter from the experimenter on Children's Hospital stationery. These weekly letters (each mother received a total of six) reiterated the original instructions, offered encouragement, and served as a reminder of the time, date, and purpose of the third visit. Except for the appointment and the specific instructions, which varied according to the subject's experimental grouping, each week's letters were identical for all groups (see Appendix F for sample letters). The control group mothers received no letters.

The third and, in most cases, final home visit took place eight weeks after the initial visit. At this
time, the Houston Test for Language Development was readministered. If the child was still inclined to be cooperative after the Houston Test, the test of specific words acquired was also given. In some cases, a fourth home visit was made in order to complete the latter test and, in other cases, the latter test was dispensed with because time pressures prevented the scheduling of a fourth visit. After testing was completed, the mothers of subjects in the experimental groups were given a summary of their child's progress and were urged to continue providing stimulation for the child. Mothers of control group children were apprised of the child's current language level (in almost all cases, the child scored below the level expected for his chronological age) and provided with materials similar to those used by the experimental groups. The fact that the child was behind for his age was emphasized if this was the case and the gains of children in the experimental groups were cited. These control group mothers were thus encouraged to begin providing language stimulation and were given the means to do so. Mothers of all subjects received a list of additional beneficial activities they could pursue with their children.

The language stimulation materials given to mothers of subjects in the experimental groups consisted of
children's illustrated story books, sticker posters measuring about 2' x 2', and colored pictures measuring approximately 2" x 3". More specifically, the high redundancy-active (HR-A) experimental group received two story books (all subjects got the same two titles), one sticker poster with 17 different objects labeled, one page of stickers for the poster, and two eight-card sets of colored picture cards (see Appendix G for exact information about the materials used in this study). The mothers in this HR-A group were to begin with the book entitled "I Walk to the Park" and read it to their child once each day for the first week. The next week they were to use the second book, the third week the original book, and so on, alternating the books. The two sets of picture cards were to be alternated in similar fashion, with the mother showing the child eight pictures every day and telling him the name of the objects. Use of the sticker poster was to consist of the mother showing the child one labeled object each day, putting on the stickers while the child watched. When, at the end of each 17-day period, the mother had covered all 17 objects on the poster, she was to start over again, still doing one object each day. During all these activities, the mothers in this HR-A group were instructed to encourage active responses on the part of the child by asking him
to name pictured objects, point to pictured objects the mother named, and repeat words after the mother (see Appendix E for the written instructions given each of the experimental groups). Each day, then, the children in this group were read one book, shown one set of eight picture cards, and taught one object on the sticker poster.

Mothers of subjects in the high redundancy-passive group (HR-P) received exactly the same materials as the HR-A group discussed above, and their procedure was exactly the same except that they were told not to elicit or encourage repetition, pointing, or naming on the part of the child under any circumstances.

Members of the low redundancy-active (LR-A) group received the following materials: eight story books (including the two titles used by the HR groups), four sticker posters with various objects labeled (including the sticker poster used by the HR groups), four pages of stickers for the posters, and one 22-page picture dictionary containing eight pictures on each page. The mothers in this LR-A group were to use a different book for each week of the program in a prescribed order beginning with the one entitled "I Walk to the Park." Thus, each of the eight books was to be read every day for one week of the program. Each mother in the LR-A
group was instructed to do one page (eight pictures) from the picture dictionary every day, starting at the beginning, taking the pages in order, and starting over again when she had done all 22 pages. The sticker posters were to be used in a prescribed order with the mother showing the child one labeled object each day, putting on the stickers while the child watched. The mothers were told to make every effort to elicit active responses from the children such as naming pictured objects, pointing to pictured objects on request, and repeating after the mother.

Mothers of subjects assigned to the low redundancy-passive (LR-P) group received exactly the same materials as the LR-A group discussed above and their procedure was exactly the same except that they were told not to attempt to elicit active responses from the child under any circumstances.

All the experimental subjects, regardless of group, received approximately the same amount of language stimulation each day in terms of time expended since each child was to be exposed daily to one book, eight pictures, and one object labeled on a poster. All the experimental mothers were requested not to use any other materials in addition to those supplied.

The control group mothers were apprised of the
nature of the study and the purpose of a control group. They were told that we wanted to see how much language progress the child would make in eight weeks "on his own" and were promised that at the end of the eight-week period they would be supplied with materials similar to those given the experimental groups. These mothers were cautioned not to do anything out of the ordinary with regard to language stimulation during the eight-week period. In effect, then, they were simply asked to treat the child as they had always done. Indications were that they did not "cheat" by reading or showing pictures to their children since during post-testing, most of the control children seemed no more aware that pictures represented real objects than they had been during the initial testing.
CHAPTER V

RESULTS

Effects of the Independent Variables

Table 3 presents the mean gain (in months) on the Houston Test for each of the groups. It also presents the mean number of book words and non-book words identified on the specific vocabulary test for each experimental group. The control group was not given the specific vocabulary test. Also, some children in the experimental groups proved uncooperative because this test was given after the Houston Test and they could not tolerate the extra time required.

Differences among the groups on these three variables were analyzed through a one-way analysis of variance using Duncan's New Multiple Range Test, followed by \( t \) tests. A paired \( t \) test was used to check differences between number of book words and non-book words correct within each experimental group. All the experimental groups made significantly greater gains on the Houston Test than the control group \((p < .005)\). Although the analysis of variance using the Duncan Test did not indicate any significant differences among the experimental
### TABLE 3
COMPARATIVE GAINS IN LANGUAGE LEVEL

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean gain on Houston Test (months)</th>
<th>s.d.</th>
<th>Mean # book words correct</th>
<th>s.d.</th>
<th>Mean # non-book words correct</th>
<th>s.d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR-P</td>
<td>7.306 (N=11)</td>
<td>3.0034</td>
<td>a 10.333 (N=6)</td>
<td>3.2042</td>
<td>6.667 (N=6)</td>
<td>2.8752</td>
</tr>
<tr>
<td>HR-A</td>
<td>6.187 (N=9)</td>
<td>2.1430</td>
<td>b 11.222 (N=9)</td>
<td>2.2791</td>
<td>7.000 (N=9)</td>
<td>2.000</td>
</tr>
<tr>
<td>LR-A</td>
<td>5.668 (N=9)</td>
<td>1.6899</td>
<td>8.714 (N=7)</td>
<td>3.4017</td>
<td>6.286 (N=7)</td>
<td>3.5923</td>
</tr>
<tr>
<td>LR-P</td>
<td>5.486 (N=11)</td>
<td>1.4018</td>
<td>b 8.857 (N=7)</td>
<td>3.3381</td>
<td>5.000 (N=7)</td>
<td>2.2361</td>
</tr>
<tr>
<td>Controls</td>
<td>3.411 (N=13)</td>
<td>1.8308</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* > controls (p < .005)

a > corresponding # non-book words (p < .05)

b > corresponding # non-book words (p < .005)
groups' gains on the Houston Test, t tests indicated that the HR-P group gained significantly more than the LR-P group \( p < .05 \) and that the difference in gain between the HR-P group and the LR-A group approached significance \( p < .10 \). The Duncan Test analysis of variance also did not reveal any significant differences among the experimental groups on either the number of book words correct or the number of non-book words correct. The t tests indicated that the differences between the HR-A group and both the LR-A and LR-P groups on number of book words correct approached significance \( p < .08 \) and that the HR-A group identified significantly more non-book words correctly than the LR-P group \( p < .05 \). The paired t tests used to check for differences between the number of book and non-book words correct within each group indicated that each of the groups except the HR-A group identified significantly more book words correctly than non-book words.

In general, then, the HR groups seem to show somewhat greater gains in language development, although the differences are not always significant. In those instances when there are significant or nearly significant differences, they are always in favor of the HR groups over the LR groups. Since the sample sizes in this study were quite small, it seems reasonable to
suggest that larger sample sizes might yield more significant differences in the same direction.

In terms of the hypotheses presented in Chapter III, the results were as follows. The first hypothesis, that all four experimental groups would make significantly greater gains in language development (as measured by the Houston Test) than the control group, was clearly confirmed. The second hypothesis, that the LR-A group would make significantly greater gains in language development than the other three experimental groups, was not confirmed. The third hypothesis, that the HR-P group would gain significantly less in terms of language development than the other three experimental groups, was also not confirmed. The fourth hypothesis, that there would be no significant differences in language development gains between the LR-P and HR-A groups was partially confirmed. There was no significant difference between the groups with respect to gain on the Houston Test. However, the HR-A group identified significantly more non-book words correctly than the LR-P group ($p < .05$) and the difference between the two groups on number of book words correct approached significance ($p < .08$) with the HR-A group getting more book words correct. The fifth hypothesis, that all the experimental groups would identify significantly more
book words correctly than non-book words, was partially confirmed since all the experimental groups except HR-A had significantly more book words right than non-book words.

Relationships Among Variables

In order to determine what relationships, if any, existed among the seven variables on which data were available (i.e., child's initial language deficit on the Houston Test, child's age, mother's I.Q., home stimulation score, gain on the Houston Test, number of book words correct, and number of non-book words correct), a correlation matrix was generated using the Pearson Product-Moment Correlation with Item Deletion method. This method is used when not all subjects have scores on all the variables, as was the case in this study. Table 4 presents the correlation matrix with sample sizes in parentheses.

A perusal of Table 4 indicates that there is a significant negative correlation (-.53) between initial language deficit and home stimulation score (p < .01), between initial language deficit and number of book words correct (-.62, p < .01), and between initial language deficit and number of non-book words correct (-.47, p < .01). There was a significant positive
**TABLE 4**

**CORRELATION MATRIX**

<table>
<thead>
<tr>
<th></th>
<th>Initial deficit (Houston)</th>
<th>Gain (Houston)</th>
<th>Mother's I.Q.</th>
<th>STIM</th>
<th>Book words correct</th>
<th>Non-book words correct</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial deficit</td>
<td>1.00</td>
<td>0.06</td>
<td>-0.08</td>
<td>-0.53**</td>
<td>-0.62**</td>
<td>-0.47**</td>
<td>0.11</td>
</tr>
<tr>
<td>(Houston)</td>
<td>(N=78)</td>
<td>(N=53)</td>
<td>(N=71)</td>
<td>(N=66)</td>
<td>(N=29)</td>
<td>(N=29)</td>
<td>(N=78)</td>
</tr>
<tr>
<td>Gain</td>
<td>1.00</td>
<td>0.16</td>
<td>0.00</td>
<td>-0.03</td>
<td>0.21</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>(Houston)</td>
<td>(N=53)</td>
<td>(N=53)</td>
<td>(N=53)</td>
<td>(N=29)</td>
<td>(N=29)</td>
<td>(N=29)</td>
<td>(N=53)</td>
</tr>
<tr>
<td>Mother's I.Q.</td>
<td>1.00</td>
<td>0.19</td>
<td>0.08</td>
<td>0.11</td>
<td>-0.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(N=71)</td>
<td>(N=66)</td>
<td>(N=29)</td>
<td>(N=29)</td>
<td>(N=71)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STIM</td>
<td>1.00</td>
<td>0.42*</td>
<td>0.30</td>
<td>-0.20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(N=66)</td>
<td>(N=29)</td>
<td>(N=29)</td>
<td>(N=66)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Book words correct</td>
<td>1.00</td>
<td>0.71**</td>
<td>0.31*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(N=29)</td>
<td>(N=29)</td>
<td>(N=29)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-book words correct</td>
<td>1.00</td>
<td>0.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(N=29)</td>
<td>(N=29)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(N=78)</td>
</tr>
</tbody>
</table>

*p < .05    **p < .01 | ^sample sizes in parentheses
correlation between home stimulation score and number of book words correct (\( .42, p < .05 \)), between number of book words correct and number of non-book words correct (\( .71, p < .01 \)), and between number of book words correct and child's age (\( .32, p < .05 \)). It is interesting to note that neither mother's I.Q. nor gain on the Houston Test was significantly correlated with any other variable.

Mother and Child Attitudes and Performance

Of the 59 mothers who were presented with experimental materials and asked to provide eight weeks of systematic and focused language stimulation for their children by following the directions they were given, 40 mothers did so. Thus, 67.8\% or roughly two-thirds of the mothers remained in the program to the end while 32.2\% (\( N=19 \)) or roughly one-third dropped out. There were no drop-outs from the control group. Furthermore, of the 19 mothers who dropped out, only 10 appeared to do so because of apparent unreliability or lack of interest. The other nine encountered impediments such as unexpected eye surgery on the mother, miscarriage resulting in hospitalization, death in the family, marital difficulties, husband hospitalized, mother entered a job training program, etc.
The majority of mothers and those few fathers who were encountered were quite enthusiastic about their child's participation in the program. Some of the control group mothers would have preferred to have their child in one of the experimental groups but were mollified by the promise of receiving language stimulation materials at the end of the eight-week period. Experimental group mothers often expressed surprise at their child's interest in the books and other materials. Many were eager to show what their child had learned and declared their intention to continue working with the child now that they had seen what he was capable of learning.

Certain of the experimental materials proved exceptionally popular with the children. Although the picture dictionary given to the LR groups was liked well enough by the children, the picture cards given to the HR groups appeared to hold enormous appeal for children in this 18 to 21-month age range. Many mothers spontaneously commented on how much the children enjoyed the cards. Predictably, some of the eight books used in this study were more popular than others. However, one book used by all the experimental groups entitled "I Walk to the Park" was an almost universal favorite. This was also the book used by each of the groups
during the first week of the program.

In the course of testing the children for this study, the experimenter noted in passing that some children would spontaneously or with little urging repeat words they heard while others repeated either not at all or only after considerable urging on the part of the mother and experimenter. These tendencies were highlighted on one part of the Houston Test where the children were supposed to repeat certain words so the experimenter could check their pronunciation. However, the possible impact of such repeating or non-repeating tendencies did not become clear until a mother whose child was in the LR-A group complained that he would only rarely engage in the active verbal responses called for by the instructions. Then, too, a few mothers with children in one of the passive groups reported that their children frequently made active verbal responses despite the fact that they were not at all encouraged to do so. The possible implications of such reports (see next chapter) made it seem wise to classify the experimental children as "repeaters" or "non-repeaters." This was done, based on the experimenter's observations and/or the mother's report of the child's conduct when she was using the experimental materials with him.
Table 5 shows the number of repeaters and non-repeaters in each experimental group.

<table>
<thead>
<tr>
<th>Group</th>
<th># Repeaters</th>
<th># Non-Repeaters</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR-A</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>HR-P</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>LR-A</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>LR-P</td>
<td>1</td>
<td>10</td>
</tr>
</tbody>
</table>

It is interesting to note that, of the 22 children assigned to a passive group, only five were classified as repeaters and, of the 18 children assigned to an active group, only three were classified as non-repeaters. This apparent "match" between the natural inclination of most of the children and the experimental condition to which they were assigned seems improbable on the basis of chance alone. It can perhaps be accounted for by the possibility that some children were flexible and simply went along with the experimental condition to which they were assigned, repeating or not repeating as required. Under the dual definition of "repeater" used in this study (i.e., repeated
spontaneously or would repeat readily if asked), these flexible children might have been classified either way, depending on their assigned experimental condition.

Table 6 shows the results of some comparisons between repeaters as a group and non-repeaters as a group, using t tests. As can be seen from the table, non-repeaters tended to have a greater initial language deficit than did repeaters (p < .005) and the mothers of non-repeaters had a higher mean I.Q. than the mothers of repeaters (p < .025). The repeaters as a group tended to have higher home stimulation scores than the non-repeaters (p < .05) and they also knew more book words (p < .005) and more non-book words (p < .01) than the non-repeaters.

In order to see if active verbal production affected language learning when redundancy was held constant, HR repeaters (N=13) were compared with HR non-repeaters (N=7) and LR repeaters (N=7) were compared with LR non-repeaters (N=13) in terms of gain on the Houston Test and no significant differences were found. The same comparisons with respect to number of book words and non-book words correctly identified were not done because of the extremely small sample size in some groups.
TABLE 6

COMPARISON OF REPEATERS AND NON-REPEATERS

<table>
<thead>
<tr>
<th>Groups compared</th>
<th>Initial deficit (Houston)</th>
<th>Age</th>
<th>Mother's I.Q.</th>
<th>STIM</th>
<th># Book words correct</th>
<th># Non-book words correct</th>
<th>Gain (Houston)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repeaters (R) and</td>
<td>N-R &gt; R</td>
<td>N.S.</td>
<td>N-R &gt; R</td>
<td>R &gt; N-R</td>
<td>R &gt; N-R</td>
<td>R &gt; N-R</td>
<td>N.S.</td>
</tr>
<tr>
<td>Non-Repeaters (N-R)</td>
<td>p &lt; .005</td>
<td></td>
<td>p &lt; .025</td>
<td>p &lt; .05</td>
<td>p &lt; .005</td>
<td>p &lt; .01</td>
<td></td>
</tr>
<tr>
<td>LR Repeaters</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>N.S.</td>
</tr>
<tr>
<td>and LR Non-Repeaters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR Repeaters</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>N.S.</td>
</tr>
<tr>
<td>and HR Non-Repeaters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The implications of these results are explored in the next chapter.
CHAPTER VI
DISCUSSION

Some Conclusions

The fact that all the experimental groups in this study showed a significantly greater gain on the Houston Test than the control group even though the sample sizes were quite small strongly suggests that reading to children in the 18 to 21-month age range and teaching them the names of pictured objects has a highly beneficial effect on language development. The fact that three of the four experimental groups learned significantly more book words than non-book words also supports this conclusion. It is interesting to note that all the experimental groups gained enough to overcome the initial deficit so that, as a group, each was functioning at or above age level in terms of language development as measured by the Houston Test. On the other hand, the controls, as a group, remained over two months below age level in terms of language development. The positive results of this study do not come as a complete surprise since a study by Irwin (1960) using "working-class" mothers to read to their own infants and another by
Fodor (1967) with Fodor, his wife, and an undergraduate student doing the reading had both already shown that there were beneficial effects on language development as a result of reading to young children. However, one difference between the present study and those by Irwin (1960) and Fodor (1967) is the length of time over which the systematic and focused language stimulation took place. In the Irwin study, the children were read to every day from age 13 months to age 30 months for a total duration of 17 months. In the Fodor study, children aged 21 to 30 months were read to five days a week over a three-month period. However, the program designed for the present study lasted only eight weeks and, on the average, the mothers reported that they missed about seven days. Thus, this study has demonstrated that beneficial effects on language development can be produced in a relatively short period of time.

Previous studies using mothers as teachers of their own children have usually been quite elaborate. Typically, they have involved weekly home visits and one even paid the mothers for participation and transported them to monthly meetings in addition to providing monthly home visits. In contrast, the present study provided only three home visits in an eight-week period and the mothers were virtually on their own for the last seven
weeks of the program except for the weekly letters they received. Despite this minimal account of contact and supervision, two-thirds of the mothers who started satisfactorily completed the prescribed language stimulation program. Furthermore, there is some reason to believe that many of the drop-outs (9 of 19) would have completed the program satisfactorily had unavoidable personal problems not interfered. Therefore, it appears that many "lower-class" mothers may be able to function effectively as sources of some kinds of intellectual stimulation for their children with less supervision than was heretofore believed feasible. The advantages in terms of monetary cost and professional time are obvious.

The Redundancy Variable

As noted in the last chapter, the results of this study tended to favor the HR groups over the LR groups. Since these results run counter to those predicted, a discussion of possible reasons is clearly in order. Originally, assignment to one of the LR groups was believed to be an advantage over assignment to one of the HR groups. This belief was based on the reasoning that the LR program of stimulation offered enough repetition to establish cognitive familiarity without
carrying the repetition to the point where a need for novelty would interfere with attentional processes.
Conversely, it was thought that the HR program of stimulation would prove so repetitious that the need for novelty would eventually result in lack of attention. Obviously, this reasoning was in error. The results of the study suggest that the amount of redundancy offered by the HR program was more nearly optimal for children of this age than the amount offered by the LR program. Furthermore, mothers' reports and the experimenter's observations suggest that the HR condition could have provided even more redundancy than it did and still have been as effective if not more so. For example, during the second home visit to a little boy in the HR-P group, the experimenter saw him repeatedly push away the new book his mother was trying to introduce while reaching for the book which had already been read to him every day during the past week. In addition to the almost universal popularity of the first book used by all the experimental groups (the same title in all cases), several mothers spontaneously commented that their children showed a preference for the first book over the other(s). It is difficult to know whether this preference simply reflected the greater appeal of that particular book for children of this age or whether, after a week of
exposure to that book, they were still at the stage described by Hunt (1963) at which emerging recognition motivated them to seek further exposure to it.

The difficulty in comparing results from different studies concerned with the effect of redundancy is that each study uses a different measure of redundancy. For example, in the work of Friedlander and his students, degree of redundancy was typically defined in terms of how many seconds elapsed before his tape-recorded stimuli repeated themselves. In the present study, degree of redundancy was thought of in terms of how many times a book was read to a child, or how many times he was shown a set of pictures. This lack of a common unit for expressing degree of redundancy led to the erroneous prediction that the LR experimental condition in this study would provide a more nearly optimal level of redundancy than the HR experimental condition. That is, lacking a common unit of redundancy which would enable her to translate the results of previous studies into a language stimulation program featuring an optimal level of redundancy, the experimenter guessed at what sort of program might furnish an optimal level. As a result, the amount of redundancy (in terms of the number of exposures to a given piece of the experimental materials) necessary for the 18 to 21-month-old child to
reach and then pass from a state of recognize famil-
liarity to a need for novelty appears to have been
grossly underestimated. This underestimation gave rise
to the original erroneous assumption that assignment to
one of the LR groups was an advantage over assignment
to one of the HR groups.

At any rate, a tentative conclusion from the
results of this study is that the degree of visual and
auditory redundancy a young child is exposed to does
make some difference in his rate of language develop-
ment.

Correlations Among Variables
Certain of the relationships indicated by the cor-
relation matrix are suggestive and merit discussion.
The lack of correlation between some variables also
seems worth noting. The fact that there is a negative
correlation of -.53 between home stimulation score and
initial language deficit as measured by the Houston Test
is not surprising. The idea that a child's language
level falls further below average as the level of stimu-
lation available in his home decreases makes sense both
on a common sense level and in terms of the generally-
accepted notions concerning the effects of "cultural
deprivation." A study by Young (1971), using the STIM
measure, also found that level of home stimulation was an important factor influencing young children's language abilities.

There was a significant positive correlation ($r = .42$) between home stimulation score and number of book words identified, although there was no correlation between home stimulation score and gain on the Houston Test. It is possible that mothers with high STIM scores were more highly motivated to see that their child did well on the post-tests than were mothers with lower STIM scores. If this were the case, the wish to have the child do well might take the obvious form of relatively intensive teaching of individual words and corresponding pictures. Such "coaching" would almost inevitably be reflected on a picture vocabulary test but not on a more general measure like the Houston Test which measures various aspects of language development in a variety of ways. It may also be that children from homes with higher STIM scores, who tended to exhibit a lesser initial language deficit, were at a stage of language development at which they could easily acquire the skills necessary to do well on the picture vocabulary test. On the other hand, children from homes offering less stimulation, who tended to be farther behind in language development at the beginning of the study, may
have had other more elementary language skills to learn before being capable of acquiring the skills necessary to succeed on the picture vocabulary test. This would result in a positive correlation between STIM score and number of book words learned.

The same explanation might account for the fact that the number of book words identified was negatively correlated with initial language deficit \( (r=-.62) \) as was the number of non-book words identified \( (r=-.47) \). This explanation could be checked by seeing if there is a significant positive correlation between language age at the beginning of the study and number of book words identified. Because of the negative correlation between initial deficit and STIM score, one might suggest that if the previously-mentioned hypothesis that mothers with lower STIM scores tend to do less "coaching" than mothers with high STIM scores is valid, then this might also help to explain the negative correlation between initial deficit and number of book words and non-book words identified.

The high positive correlation between number of book words identified and number of non-book words identified \( (r=.71) \) may simply reflect the fact that the two scores were obtained by identical processes, except that the word lists were different. Intuitively speaking, it
makes sense that children who have been able to acquire a relatively large number of words from the experimental materials should also have been able to acquire a relatively large number of words from other existing sources, and vice-versa.

There was also a small, but significant, correlation ($r=.32$) between child's age and number of book words identified. This may support the idea that a child must reach a certain stage before he can acquire the language skills necessary to do well on the picture vocabulary test. The above correlation might well be higher if there had been less discrepancy between the initial chronological age of the children in this study and their initial language level.

The finding that mother's I.Q., as measured by the PFVT, is not significantly correlated with any of the other variables is somewhat surprising. It may be that the limited I.Q. range of the mothers in this study is responsible for this lack of correlation. A study of "lower-class" children 30 to 37 months of age (Young, 1971), which also used the STIM to assess level of home stimulation and the PFVT to measure mother's I.Q., led to the conclusion that "... home stimulation is more strongly related to a child's language abilities and intellectual level than is the intelligence of the
mother (p. 41)." The relevant data from the present study also seem to indicate that the level of stimulation a mother provides is more important to the early language development of her child than is her level of "intelligence," as measured by the PPVT. One must keep in mind that the PPVT, which is a screening instrument designed to measure "verbal intelligence" (Dunn, 1965) may not accurately reflect the general intelligence of the lower-status mothers in this study, whose verbal skills, in many cases, were minimal. For these mothers, the level of home stimulation they provide may be more reflective of "intelligent" behavior than the results of the PPVT.

The Active Response Variable

Comparisons among the experimental groups in terms of gain made on the Houston Test yield no evidence to suggest that active verbal and motoric responses facilitate language development in the 18 to 21-month-old child. Some might contend that there were no significant differences between the active and passive groups because there was "contamination" in the form of having repeaters in the passive groups and non-repeaters in the active groups. However, it is unlikely that this totally accounts for the lack of significant difference
since, as noted in chapter V, the majority of children assigned to an active group were repeaters and the majority of children assigned to a passive group were non-repeaters (see chapter V for possible explanation). Besides, a comparison of HR repeaters with HR non-repeaters and of LR repeaters with LR non-repeaters in terms of gain on the Houston Test yielded no significant differences. Another explanation that one might advance for the lack of significant difference in language gain between the active and passive groups is that the mothers failed to follow instructions with regard to encouraging or not encouraging verbal and motoric responses. It is, of course, impossible to know with certainty, but the experimenter tends to consider this unlikely because when, during the second home visit, the experimental mothers were simply asked to read to their children (with no reminder about specific method), most of the mothers proceeded to do so in a manner which was completely in accord with the instructions given the previous week. Naturally, the experimenter's presence would encourage compliance with her instructions. However, the impression was that these mothers were not so adept that they could easily fall into the correct pattern solely for the experimenter's benefit if they had not been using it previously.
The results of comparing repeaters as a group with non-repeaters have bearing on the issue of whether or not active verbal response has a beneficial effect on language development. Non-repeaters were found to have a significantly greater initial language deficit than repeaters while repeaters got significantly more book words and non-book words correct than non-repeaters. Repeaters also had significantly higher home stimulation scores than non-repeaters. One might explain these results by thinking of the tendency to be a repeater or non-repeater as a personality variable which endures indefinitely in some form and by concluding that repeaters get more book and non-book words right than non-repeaters because the procedures involved in the active condition (to which most of the repeaters and few of the non-repeaters were assigned) were more similar to the task of identifying words on the specific vocabulary test than were the procedures involved in the passive condition. If one conceived of the repeater personality variable as innate, the repeaters' significantly higher home stimulation score might be explained through speculation about the differential effect of the repeater and non-repeater personalities on the mother's conduct toward the child.

There are also other possible and at least equally
plausible explanations for the above results. The facts that repeaters had a lower initial language deficit and acquired more book and non-book words than non-repeaters might both be a function of level of home stimulation. The former is likely because of the significant negative correlation between home stimulation and initial language deficit and the latter is likely if one accepts the "coaching" hypothesis expounded in the previous section. In other words, it is possible that repeaters did not get more book words and non-book words correct because they repeat. Rather, they repeat more and got more book and non-book words correct because of their relatively high level of home stimulation.

A third possible explanation of the data is that the state of being a repeater is developmentally determined, that it represents a higher stage of language development which the non-repeaters will also reach eventually. Hence the greater initial language deficit of non-repeaters. Along this same line, the ability to learn to function well on a picture vocabulary test may also represent a higher stage of development. Thus the superior performance of repeaters over non-repeaters in identifying book words and non-book words. If the above two contentions were correct, then one might conclude that the repeaters had reached a higher stage of
development than non-repeaters because of their higher level of home stimulation.

Determination of which of the above three explanations comes closest to the truth will depend on further investigation. By itself, the fact that the non-repeaters exhibited a greater initial language deficit than the repeaters might suggest that active verbal production has a facilitative effect on general language development, although alternate explanations of this phenomenon are possible (see above). However, there is nothing in the results of the study proper to support the conclusion that the general language development of 18 to 21-month-old children is beneficially affected by active verbal response. Therefore, the question must remain open.

Suggestions for Further Research

In considering suggestions for further research, the following come immediately to mind: replication with a larger sample, replication with a different age, racial, or socioeconomic group, and a follow-up check for possible long-term effects of such a program. However, there are other ideas suggested by the results of the present study which are, perhaps, not quite so obvious.
Systematic research using a standard unit of redundancy could answer the question of whether or not the amount of redundancy needed for the establishment of recognitive familiarity increases with age. The Friedlander (1970) approach might, of course, be used but use of the unit of redundancy employed in the present study might be more practical for those interested in early cognitive stimulation. One possible way to determine how much redundancy is optimal would be to present children with a fixed array of several books each day, read them the one they choose, and record the choices in order to see what sort of pattern emerged. One could use the same approach with different age groups to investigate the questions of whether and how the need for redundancy varies as a function of age.

The "repeater" phenomenon observed in the present study might certainly be a legitimate object of further research. One might seek to determine more definitely the correlates and causes of being a repeater or non-repeater. The question of whether the state of being a repeater or non-repeater is a personality variable or a developmental stage might also be pursued. Another idea would be to design an experiment comparing the effect on language development of exposing children to a language stimulation program which fitted their natural
inclination to repeat or not as opposed to exposing them to a program requiring responses counter to their natural inclination.

This study relied on the children's mothers to provide systematic and focused language stimulation. One might wish to explore whether or not attachment to the person providing the stimulation has any relationship to the effectiveness of that stimulation. For example, this could be done by comparing the language progress of children read to by their mothers, children read to by a single volunteer, and children read to by several different volunteers. Investigation of a child's response to a program of language stimulation as a function of variation in specific maternal characteristics might also be worthwhile.

Another possible area of interest might be the type of materials most effective for children of a given age.
APPENDIX A

INITIAL APPROACH TO MOTHERS

My name is Miss Meyers and I'm calling from Children's Hospital about a language development program we're starting for little children 18 to 21 months old. I understand that you have a child that age? (affirmative answer) Well, let me tell you about the program and see if you'd be interested. If you were interested, what would happen is that I would come to your house at the beginning of the program and give your little (girl, boy) a language test to see what his level was. Then I'd give you some books and pictures and posters and you'd spend a little bit of time every day for two months reading to your child and showing him the pictures and the things on the posters. Then I'd come back at the end of the two months and give him the same test over again to see how much progress he had made. This is a free program sponsored by Children's Hospital and we're doing it in order to find out if it's a good program that really works and really does help little children learn to talk better. I wonder if you think you might be interested in this?
APPENDIX B

HOUSTON TEST ITEMS
(see test manual for specifics)

6-MONTH LEVEL
Smiles
Vocalizes back vowels
"Talks" to inanimate objects
Attends to voice
Blows bubbles
Laughs out loud
Controls volume
Squeals
Uses vocal grunt

12-MONTH LEVEL
Holds out arms to be taken
Vocalizes syllables
Repeats syllables
Imitates sounds
Uses reflexive jargon
Responds to "bye-bye"
Uses 2-3 words
Will pat-a-cake
Understands inhibitions

18-MONTH LEVEL
Converses in jargon
Points to indicate wants
Uses 10 or more words
Identifies three parts of doll
Names one picture
Points to five pictures

24-MONTH LEVEL
Identifies five parts of doll
Obey one preposition
Names eight pictures
Points to ten pictures
Articulates labials
Uses three-word sentence
30-MONTH LEVEL
- Obeys two prepositions
- Names eleven pictures
- Points to fifteen pictures
- Articulates dentals
- Verbalizes action
- Uses pronoun "I"

36-MONTH LEVEL
- Obeys three prepositions
- Names sixteen pictures
- Points to nineteen pictures
- Articulates velars
- Gives four lines from memory
- Tells what happened
- Names his sex
- Gives full name
- Announces his action
- Protests inaccuracies
## APPENDIX C

### SPECIFIC VOCABULARY TEST

<table>
<thead>
<tr>
<th>From Books</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>*A LADY</td>
<td>BED</td>
</tr>
<tr>
<td>A KITTEN</td>
<td>FISH</td>
</tr>
<tr>
<td>A SPOON</td>
<td>CHAIR</td>
</tr>
<tr>
<td>B MAN</td>
<td>BANANA</td>
</tr>
<tr>
<td>C SOCK</td>
<td>PENCIL</td>
</tr>
<tr>
<td>1 TABLE</td>
<td>CAR</td>
</tr>
<tr>
<td>3 BABY</td>
<td>TREE</td>
</tr>
<tr>
<td>4 DOG</td>
<td>BROOM</td>
</tr>
<tr>
<td>4 TRUCK</td>
<td>SOAP</td>
</tr>
<tr>
<td>4 GIRL</td>
<td>CUP</td>
</tr>
<tr>
<td>6 HAND</td>
<td>DUCK</td>
</tr>
<tr>
<td>8 TOYS</td>
<td>KEYS</td>
</tr>
<tr>
<td>10 SQUIRREL</td>
<td>BEAR</td>
</tr>
<tr>
<td>10 TURTLE</td>
<td>BELL</td>
</tr>
<tr>
<td>49 STOPLIGHT</td>
<td>ISLAND</td>
</tr>
</tbody>
</table>

*Letters and numbers indicate PPVT plate from which illustrations came.*

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### APPENDIX D

**INVENTORY OF HOME STIMULATION**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

#### I. EMOTIONAL AND VERBAL RESPONSIVITY
OF MOTHER

1. Mother spontaneously vocalizes to child at least twice during visit (excluding scolding).
2. Mother responds to child's vocalizations with a verbal response.
3. Mother tells child the name of some object during visit or says name of person or object in a "teaching" style.
4. Mother's speech is distinct, clear, and audible.
5. Mother initiates verbal interchanges with observer—asks questions, makes spontaneous comments.
6. Mother expresses ideas freely and easily and uses statements of appropriate length for conversation (e.g., gives more than brief answers).
7. Mother permits child occasionally to engage in "messy" types of play.
8. Mother spontaneously praises child's qualities or behavior twice during visit.
9. When speaking of or to child, mother's voice conveys positive feeling.
10. Mother caresses or kisses child at least once during visit.
11. Mother shows some positive emotional responses to praise of child offered by visitor.

**SUBSCORE**

---

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II. AVOIDANCE OF RESTRICTION
AND PUNISHMENT

12. Mother does not shout at child during visit.
13. Mother does not express overt annoyance with or hostility toward child.
14. Mother neither slaps nor spanks child during visit.
15. Mother reports that no more than one instance of physical punishment occurred during the past week.
16. Mother does not scold or derogate child during visit.
17. Mother does not interfere with child's actions or restrict child's movements more than three times during visit.
18. At least ten books are present and visible.
19. Family has a pet.

SUBSCORE

III. ORGANIZATION OF PHYSICAL AND TEMPORAL ENVIRONMENT

20. When mother is away, care is provided by one of three regular substitutes.
21. Someone takes child into grocery store at least once a week.
22. Child gets out of house at least four times a week.
23. Child is taken regularly to doctor's office or clinic.
24. Child has a special place in which to keep his toys and "treasures".
25. Child's play environment appears safe and free of hazards.

SUBSCORE
IV. PROVISION OF APPROPRIATE PLAY MATERIALS

26. Child has some muscle activity toys or equipment.
27. Child has push or pull toy.
28. Child has stroller or walker, kiddie car, scooter, or tricycle.
29. Mother provides toys or interesting activities for child during interview.
30. Provides learning equipment appropriate to age—cuddly toy or role-playing toys.
31. Provides learning equipment appropriate to age—mobile, table and chairs, high chair, play pen.
32. Provides eye-hand coordination toys—items to go in and out of receptacle, fit together toys, beads.
33. Provides eye-hand coordination toys that permit combinations—stacking or nesting toys, blocks or building toys.
34. Provides toys for literature and music.

SUBSCORE

V. MATERNAL INVOLVEMENT WITH CHILD

35. Mother tends to keep child within visual range and to look at him often.
36. Mother "talks" to child while doing her work.
37. Mother consciously encourages developmental advance.
38. Mother invests "maturing" toys with value via her attention.
40. Mother provides toys that challenge child to develop new skills.

SUBSCORE
VI. OPPORTUNITIES FOR VARIETY IN DAILY STIMULATION

41. Father provides some caretaking every day. _____________________
42. Mother reads stories at least three times weekly. _____________________
43. Child eats at least one meal per day with mother and father. _____________________
44. Family visits or receives visits from relatives. _____________________
45. Child has three or more books of his own. _____________________

SUBSCORE _____________________
APPENDIX E

WRITTEN INSTRUCTIONS GIVEN TO MOTHERS

(For HR-P Group)

DIRECTIONS FOR USE OF THINGS FROM CHILDREN’S HOSPITAL.

You have the following materials:

Two story books
Two sets of picture cards (eight in each set)
One sticker poster for the wall

Here is what to do with the STORY BOOKS:

The FIRST WEEK, use the book called I WALK TO THE PARK. Read it to your child once each day for the first week. As you go through the book, point out the pictures to the child and name the objects in the pictures for him. DO NOT have the child point at the pictures or say the names of the objects himself. You do the naming and pointing, not the child.

During the SECOND WEEK, use the COREY BAKER book and do the same thing. That is, read the book to your child once a day, pointing out and naming the pictures. During the third week, go back to the I WALK TO THE PARK book, and so on according to the schedule below. At the end of each week, change to the other book. Here is the schedule to follow:

FIRST WEEK: I WALK TO THE PARK
SECOND WEEK: COREY BAKER
THIRD WEEK: I WALK TO THE PARK
FOURTH WEEK: COREY BAKER
FIFTH WEEK: I WALK TO THE PARK
SIXTH WEEK: COREY BAKER
SEVENTH WEEK: I WALK TO THE PARK
EIGHTH WEEK: COREY BAKER

Be sure to follow this schedule exactly.
Here is what to do with the PICTURE CARDS:

One set has a fish, a girl, a pig, a kitten, a leaf, a car, a sun, and a house. Use this set the first week. Once each day, show all eight cards to your child one at a time and tell him what each picture is. Let him look at it but DO NOT have him say the name of the picture or point. The second week, do the same thing using the other set of cards. AT THE END OF EACH WEEK, CHANGE to the other set of cards.

Here is what to do with the STICKER POSTER:

Put it up on the wall so the side with the boy and girl is showing. Hang it low enough that your child can see it easily. The names of different parts of the boy and girl are printed on the poster. Each day, stand in front of the poster with your child, read the name of one part, and point to it for the child. DO NOT have him say the name or point. You do it while he watches. Start with "boy" and show him the boy. The next day, do "ear", the next day "nose" and so on down. When you have finished the parts of the boy, go on to the girl. Do one part each day. Some parts are drawn with a dotted line. This means there is a sticker to be licked and stuck on that part. Do this while your child watches. Say the name of the part for the child while you are putting the sticker on. When you have done all the parts on the poster (this will be at the end of 17 days), start over. Keep naming one part a day until the end of the two month period.

Each day, then, you will:

1. read one story book to your child
2. show him eight picture cards
3. name one THING on the wall poster.

It is very important that you do no more and no less than this every day. This will take no longer than 20-30 minutes each day at the most. Each week, you will receive a letter from Children's Hospital. This will remind you of which book and pictures you should be using for the week.

If you have any questions at all, please feel free to call Dr. Rie's office at Children's Hospital. The number is 253-8841, extension 466. If neither Dr. Rie
nor I is in, please leave your name and phone number with the secretary and one of us will call you back as soon as possible.
(For HR-A Group)

DIRECTIONS FOR USE OF THINGS FROM CHILDREN'S HOSPITAL.

You have the following materials:

- Two story books
- Two sets of picture cards (eight in each set)
- One sticker poster for the wall

Here is what to do with the STORY BOOKS:

**THE FIRST WEEK**, use the book called *I WALK TO THE PARK*. Read it to your child once each day for the first week. As you go through the book, try very hard to get your child to SAY and POINT. Name the things in the pictures and have him say the name. Ask him where a certain thing is in the picture and have him point to it. It is very important that you get your child to say the names of objects in the book and point to them when you ask him to. For example, you might say to the child, "Where is the little boy?" If he can't find the picture of the little boy, show him and then have him point. Get him to repeat the names of pictures in the book after you. Ask him what something is, tell him if he doesn't know, and then have him say it.

During **THE SECOND WEEK**, use the COREY BAKER book and do the same thing. That is, read the book to your child once a day, pointing out and naming the pictures and getting your child to name and point. During the **THIRD WEEK**, go back to the *I WALK IN THE PARK* book, and so on according to the schedule below. At the end of each week, change to the other book. Here is the schedule to follow:

- **FIRST WEEK**: *I WALK TO THE PARK*
- **SECOND WEEK**: COREY BAKER
- **THIRD WEEK**: *I WALK TO THE PARK*
- **FOURTH WEEK**: COREY BAKER
- **FIFTH WEEK**: *I WALK TO THE PARK*
- **SIXTH WEEK**: COREY BAKER
- **SEVENTH WEEK**: *I WALK TO THE PARK*
- **EIGHTH WEEK**: COREY BAKER

Be sure to follow this schedule exactly.
Here is what to do with the PICTURE CARDS:

One set has a fish, a girl, a pig, a kitten, a leaf, a car, a sun, and a house. Use this set THE FIRST WEEK. Once each day, show all eight cards to your child one at a time and tell him what each picture is. Get him to say the names of the things, too. After going over each of the cards, put two out at a time, name one of the objects and have the child point to it. For example, say, "Where is the fish?" If the child does not seem to know, show him and then have him point and say the word. The SECOND WEEK, do the same thing using the other set of cards. AT THE END OF EACH WEEK, CHANGE to the other set of cards.

Here is what to do with the STICKER POSTER:

Put it up on the wall so the side with the boy and girl is showing. Hang it low enough that your child can see it easily. The names of different parts of the boy and girl are printed on the poster. Each day, stand in front of the poster with your child, read the name of one part, and point to it for the child. Have him say the name of the part after you, and then have him point to it. Start with "boy" and show him the boy. The next day, do "ear", the next day "nose" and so on down. When you have finished the parts of the boy, go on to the girl. Do one part each day. Some parts are drawn with a dotted line. This means there is a sticker to be licked and stuck on that part. Tell your child the name of the poster part and show him the sticker that goes with it. Have him point to where the sticker goes. If he doesn't know, show him, and then put the sticker on. Have him say the name of the part. When you have done all the parts on the poster (this will be at the end of 17 days), start over. Keep doing one part a day until the end of the two-month period.

Each day, then, you will:

1. read one story book to your child
2. show him eight picture cards
3. name one thing on the wall poster.

During each of these activities, you will be getting your child to say names of objects and point to objects when you say the name. It is very important that you do no more and no less than what is mentioned above and that you do it every day. It will take no
longer than 20-30 minutes each day at the most. Each week, you will receive a letter from Children's Hospital. This will remind you of which book and pictures you should be using for the week.

If you have any questions at all, please feel free to call Dr. Rie's office at Children's Hospital. The number is 253-8841, extension 466. If neither Dr. Rie nor I is in, please leave your name and phone number with the secretary and one of us will call you back as soon as possible.
DIRECTIONS FOR USE OF THINGS FROM CHILDREN'S HOSPITAL.

You have the following materials:

- Eight story books
- One picture dictionary
- Two sticker posters for the wall (each with two sides)

Here is what to do with the STORY BOOKS:

THE FIRST WEEK, use the book called *I WALK TO THE PARK*. Read it to your child once each day for the first week. As you go through the book, point out the pictures to the child and name the objects in the pictures for him. DO NOT have the child point at the pictures or say the names of the objects himself. You do the naming and pointing, not the child.

During the SECOND WEEK, use the book called *THE LITTLE RED HEN* and do the same thing. That is, read the book to your child once a day, pointing out and naming the pictures. During the third week, use the book called *THE HOUSE MY GRANDPA BUILT* and so on according to the schedule below. You will be using a different book every week. Here is the schedule to follow:

<table>
<thead>
<tr>
<th>WEEK</th>
<th>BOOK</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIRST</td>
<td><em>I WALK TO THE PARK</em></td>
</tr>
<tr>
<td>SECOND</td>
<td><em>THE LITTLE RED HEN</em></td>
</tr>
<tr>
<td>THIRD</td>
<td><em>THE HOUSE MY GRANDPA BUILT</em></td>
</tr>
<tr>
<td>FOURTH</td>
<td><em>THE GREAT FORT</em></td>
</tr>
<tr>
<td>FIFTH</td>
<td><em>KOBO THE KOALA BEAR</em></td>
</tr>
<tr>
<td>SIXTH</td>
<td><em>COREY BAKER</em></td>
</tr>
<tr>
<td>SEVENTH</td>
<td><em>THIN ARNOLD</em></td>
</tr>
<tr>
<td>EIGHTH</td>
<td><em>MY LITTLE DINOSAUR</em></td>
</tr>
</tbody>
</table>

Be sure to follow this schedule exactly.

Here is what to do with the PICTURE DICTIONARY:

Do only one page each day. There are eight objects pictured on each page. Show your child each picture and tell him what it is. Let him look at it but DO NOT have him say the name of the picture or point. Start with the first page of the dictionary and do a different page each day until you reach the end. When you reach the end, start over again, still doing one page each day.
Here is what to do with the STICKER POSTERS:

FIRST use the one with the boy and girl on it. Put it up on the wall so the side with the boy and girl is showing. Hang it low enough that your child can see it easily. The names of the different parts of the boy and girl are printed on the poster. Each day, stand in front of the poster with your child, read the name of one part, and point to it for the child. DO NOT have him say the name or point. You do it while he watches. Start with "boy" and show him the boy. The next day, do "ear", the next day "nose", and so on down. When you have finished the parts of the boy, go on to the girl. Do one part each day. Some parts are drawn with a dotted line. This means there is a sticker to be licked and stuck on that part. Do this while your child watches. Say the name of the part for the child while you are putting the sticker on. When you have done all the parts of the boy and girl (this will be at the end of 17 days), turn the poster over to the side with the train, airplane and other things. Do the same with this side as you did with the boy and girl. When you finish it, use the "house" side of the other poster. The last poster to use will be the one with the doctor, nurse, and other people. Remember show your child one object a day, name it for him, and stick on a sticker when there is one for the object you are on.

Each day, then, you will:

1. read one story book to your child
2. show him the objects on one page in the picture dictionary
3. name one thing on the wall poster

It is very important that you do no more and no less than this every day. This will take no longer than 20-30 minutes each day at the most. Each week, you will receive a letter from Children's Hospital. This will remind you of which book and pictures you should be using for the week.

If you have any questions at all, please feel free to call Dr. Rie's office at Children's Hospital. The number is 253-8841, extension 466. If neither Dr. Rie nor I is in, please leave your name and phone number with the secretary and one of us will call you back as soon as possible.
(For LR-A Group)

DIRECTIONS FOR USE OF THINGS FROM CHILDREN'S HOSPITAL.

You have the following materials:

Eight story books
One picture dictionary
Two sticker posters for the wall (each with two sides)

Here is what to do with the STORY BOOKS:

THE FIRST WEEK, use the book called I WALK TO THE PARK. Read it to your child once each day for the first week. As you go through the book, try very hard to get your child TO SAY AND POINT. Name the objects in the pictures and have him say the name. Ask him where a certain thing is in the picture and have him point to it. It is very important that you get your child to say the names of THINGS in the book and point to them when you ask him to. For example, you might say to the child, "Where is the little boy?" If he can't find the picture of the little boy, show him and then have him point. Get him to repeat the names of pictures in the book after you. Ask him what something is, tell him if he doesn't know, and then have him say it.

During THE SECOND WEEK use the book called THE LITTLE RED HEN and do the same thing. That is, read the book to your child once a day, pointing out and naming the pictures and getting your child to name and point. During the third week, use the book called THE HOUSE MY GRANDPA BUILT and so on according to the schedule below. You will be using a different book every week. Here is the schedule to follow:

FIRST WEEK: I WALK TO THE PARK
SECOND WEEK: THE LITTLE RED HEN
THIRD WEEK: THE HOUSE MY GRANDPA BUILT
FOURTH WEEK: THE GREAT FORT
FIFTH WEEK: KOBO THE KOALA BEAR
SIXTH WEEK: COREY BAKER
SEVENTH WEEK: THIN ARNOLD
EIGHTH WEEK: MY LITTLE DINOSAUR

Be sure to follow this schedule exactly.
Here is what to do with the PICTURE DICTIONARY:

Do only one page each day. There are eight THINGS pictured on each page. Show your child each picture and tell him what it is. Get him to say the names of the objects, too. After going over each of the THINGS, name one and have the child point to it. For example, say, "Where is the airplane?" If the child doesn't seem to know, show him and then have him point and say the word. Start with the first page of the dictionary and do a different page each day until you reach the end. When you reach the end, start over again, still doing one page each day.

Here is what to do with the STICKER POSTERS:

FIRST use the one with the boy and girl on it. Put it up on the wall so the side with the boy and girl is showing. Hang it low enough that your child can see it easily. The names of the different parts of the boy and girl are printed on the poster. Each day, stand in front of the poster with your child, read the name of one part, and point to it for the child. Have him say the name of the part after you, and then have him point to it. Start with "boy" and show him the boy. The next day, do "ear", the next day "nose" and so on down. When you have finished the parts of the boy, go on to the girl. Do one part each day. Some parts are drawn with a dotted line. This means there is a sticker to be licked and stuck on that part. Tell your child the name of the poster part and show him the sticker that goes with it. Have him point to where the sticker goes. If he doesn't know, show him, and then put the sticker on. Have him say the name of the part. When you have done all the parts of the boy and girl (this will be at the end of 17 days), turn the poster over to the side with the train, airplane, and other things. Do the same with this side as you did with the boy and girl. When you finish it, use the "house" side of the other poster. The last poster to use will be the one with the doctor, nurse and other people.

Each day, then, you will:

1. read one story book to your child
2. show him the objects on one page in the picture dictionary
3. name one thing on the wall poster.
During each of these activities, you will be encouraging your child to say names of objects and point to objects when you say the name. It is very important that you do no more and no less than what is mentioned above and that you do it every day. It will take no longer than 20-30 minutes each day at the most. Each week, you will receive a letter from Children's Hospital. This will remind you of which book and pictures you should be using for the week.

If you have any questions at all, please feel free to call Dr. Rie's office at Children's Hospital. The number is 253-8841, extension 466. If neither Dr. Rie nor I is in, please leave your name and phone number with the secretary and one of us will call you back as soon as possible.
APPENDIX F
SAMPLES OF LETTERS SENT TO MOTHERS

(To LR-A)

Dear

We're now in the third week of the Language Development Program sponsored by Children's Hospital. You should be using the HOUSE MY GRANDPA BUILT this week. Do one page a day in the picture dictionary and keep naming one part a day on the wall poster. When you have finished the boy-girl poster, turn it over and do the train and other things. It is very important to get your child actively involved. Have the child say the names of objects in the story books and picture dictionary and on the poster. Have the child point to objects when you name them.

After this week, there are five more weeks to go. I'll look forward to seeing you at the end of that time. Don't hesitate to call me at Children's Hospital if you have any questions about what you're supposed to be doing. The number is 253-8841, extension 466.

Sincerely yours,

Bonnie M. Meyers, M.A.

3-LR-A
(To LR-P)

Dear

It's the fourth week of the Language Program in which you're participating. I hope everything is going well. You should be using the GREAT PONT book and the wall poster with the train, car, airplane, etc. This week, remember that you should read the book once a day, pointing out and naming the pictures. Each day, you should do one page of the picture dictionary. Name each of the eight pictures on the page for your child. One object on the wall poster should be pointed out and named every day.

After this week, only four more weeks to go. I'll be coming to your home on (date)______________ at (time)________ as we agreed, to check your child's progress in language development. It will be fun to see how well your child has done.

Sincerely yours,

Bonnie M. Meyers, M.A.

4-LR-P

P.S. Don't forget. DO NOT have your child say the names of picture or point. You do all the naming and pointing.
(To HR-A)

Dear

I hope your child is enjoying the stories, pictures, and the poster. Have you heard your child using any new words? It's the fifth week of the program and we have only three more weeks to go. Remember I'll be visiting you again on (date) ______________________ at (time) _________. Keep up the good work and be sure to call me if there are any questions. The number is 253-8841. Ask for extension 466. See you soon.

Sincerely yours,

Bonnie M. Meyers, M.A.

5-HR-A

P.S. You should be using the I WALK IN THE PARK book this week and the set of picture cards with the fish, girl, pig, kitten, leaf, car, sun, and house. Also, don't forget the wall poster. Remember to get your child to NAME pictures and POINT to things when you say their names.
(To HR-A)

Dear

This is the sixth week that you have been using the books, poster, and picture cards with your child. That means there are only two more weeks to go after this week. I'm looking forward to seeing what your child has learned since the last time I visited. Remember that I'll be coming on (date) ____________ at (time) _____________. Keep using the books, poster, and cards every day just as you have been and call 253-8841, extension 466 if you have any questions.

Sincerely yours,

Bonnie M. Meyers, M.A.

6-HR-A

P.S. You should be using the COREY BAiKER book this week, along with the wall poster. The set of picture cards for this week is the one with the man, queen, dog, zebra, vase, wagon, chair, and next. Remember to get your child to NAME pictures and POINT to things when you say their names.
(To HR-P)

Dear

After this week, only ONE more to go! You may be getting tired of the same books and pictures after all this time, but it is important that you keep using them just as you have been. Dr. Rie and I will be very interested to see the progress your child has made as a result of your work together. See you on (date) ______ at (time) _________.

Sincerely yours,

Bonnie M. Meyers, M.A.

P.S. Besides naming one object a day on the wall poster, you should be using the I WALK IN THE PARK book this week. Also, you should be using the set of picture cards with the kitten, leaf, car, sun, house, fish, girl, and pig.
(To HR-P)

Dear

This is the LAST week of the Language Development Program sponsored by Children's Hospital. Keep using the books, poster, and pictures during this week. As you know, I'll be coming to your home on (date) at (time) to give your child some tests so we can see what the child has learned since you have been working together. I'll see you then.

Sincerely yours,

Bonnie M. Meyers, M.A.

P.S. For this last week, you should be using the COREY BAKER book and the set of cards with the man, dog, queen, vase, zebra, wagon, nest, and chair. Keep doing one object per day on the wall poster.
APPENDIX G

LIST OF MATERIALS USED

BOOKS:
I Walk to the Park, Whitman Tell-A-Tale #2559
Corey Baker, Whitman Tell-A-Tale #2506
The Great Fort, Whitman Tell-A-Tale #2510
Kobo the Koala Bear, Whitman Tell-A-Tale #2535
The House My Grandpa Built, Whitman Tell-A-Tale #2530
Thin Arnold, Whitman Tell-A-Tale #2691
The Little Red Hen, Rand-McNally Junior Elf Book #8030
My Little Dinosaur, Little Golden Book #571

PICTURE DICTIONARY:
Little Golden Picture Dictionary #369

PICTURE CARDS:
Whitman Help Yourself Flash Cards #4578 (two sets of eight cards each selected from among the above)

POSTERS:
Whitman Preschool See and Say Sticker Posters #1676
BIBLIOGRAPHY


Hollingshead, A. B. *Two Factor Index of Social Position*, 1967. (Obtainable by sending $1.00 to author, 1965 Yale Station, New Haven, Conn.).


Young, C. L. The effect of two factors on the young disadvantaged child's language ability and his intelligence: The level of stimulation in the home and the mother's intelligence.