1971

Differential Effects of Various Language Sampling Procedures on Children's Verbal Output

Wanda G. Webb
Eastern Illinois University

PAPER CERTIFICATE #2

TO: Graduate Degree Candidates who have written formal theses.

SUBJECT: Permission to reproduce theses.

The University Library is receiving a number of requests from other institutions asking permission to reproduce dissertations for inclusion in their library holdings. Although no copyright laws are involved, we feel that professional courtesy demands that permission be obtained from the author before we allow theses to be copied.

Please sign one of the following statements.

Booth Library of Eastern Illinois University has my permission to lend my thesis to a reputable college or university for the purpose of copying it for inclusion in that institution's library or research holdings.

11-11-71
Date

Author

I respectfully request Booth Library of Eastern Illinois University not allow my thesis be reproduced because _____

_____

_____

_____
Date

_____
Author

DIFFERENTIAL EFFECTS OF VARIOUS LANGUAGE SAMPLING PROCEDURES ON CHILDREN'S VERBAL OUTPUT

(TITLE)

BY

WANDA G. WEBB

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF

MASTER OF SCIENCE

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS

1971
YEAR

I HEREBY RECOMMEND THIS THESIS BE ACCEPTED AS FULFILLING
THIS PART OF THE GRADUATE DEGREE CITED ABOVE

11/16/71
DATE

11/16/71
DATE

DIFFERENTIAL EFFECTS OF VARIOUS LANGUAGE SAMPLING PROCEDURES ON CHILDREN'S VERBAL OUTPUT

By

WANDA G. WEBB

B.S. in Speech Pathology, Middle Tennessee State University, 1970

ABSTRACT OF A THESIS

Submitted in partial fulfillment of the requirements for the degree
of Master of Science at the Graduate School
of Eastern Illinois University

CHARLESTON, ILLINOIS
1971

ABSTRACT

The purpose of this investigation was to determine whether differences exist among four different language sampling procedures as to measures of communicative competence. Specifically, three questions were posed:

1. Do statistically significant differences exist among obtained LCI scores for the following procedures for evoking child language samples: (1) Toys, (2) Verbal Directives, (3) Child-generated Pictures, and (4) Radio Telemetry.

2. If differences exist, are they manifested in: (1) Noun Phrase One, (2) Verb Phrase One, (3) Noun Phrase Two.

3. What is the frequency of occurrence of the obtained grammatical structures for the sampling procedure yielding the highest LCI scores?

PROCEDURE Four language samples were elicited from each of ten five-year-old children using the sampling procedures listed above. The verbal directives consisted of 15 questions to the child about himself and his environment. For the procedure utilizing toys, each child was asked to tell the examiner about nine different toys. For the child-generated pictures, each subject was trained by the examiner to use a camera, and was allowed to take a camera home and take pictures of anything he wished. A language sample was then elicited using the child's developed prints as stimuli. Utilizing a radio telemetry device required that each child wear a hamess and a dummy microphone for two days for familiarization while at school, and then wear the actual microphone the third day. A 30 minute language sample was recorded from each child while he was on the school playground with his peers. The examiner elicited, transcribed, and scored all language samples. The LCI was the measure used for linguistic analysis.

RESULTS AND DISCUSSION Mean LCI scores, standard deviation, and measures of skewness and kurtosis were computed for each sampling procedure. To assess the significance of the differences in group means, a one-way analysis of variance and then six *t* tests compairing all possible pairs were computed. Verbal directives were found to yield mean LCI scores which were significantly higher than those of toys and radio telemetry, and statistically equivalent to those from child-generated pictures. The values for verbal directives also demonstrated the least amount of response variability, and also a closer approximation to the normal curve than the other three procedures. Six *t* tests were also employed to determine whether differences among sampling procedures were manifested in any of the subtest indices. Mean index scores from verbal directives were found to be either significantly higher than or statistically equivalent to those for any of the other three methods. The frequency of occurrence of subtest structures was charted for verbal directives from the Miner study (1970), and the frequency of occurrence for subtest structures from child-generated pictures from the present study was charted for comparison.

CONCLUSIONS:

1. The stimulus method does differentially effect verbal output, and, hence, judgments of communicative competence.

2. For the children utilized in this investigation, verbal directives were the highest and most stable indicator of communicative competence.

3. The similarity in structures generated in response to verbal directives and those generated in response to child-generated pictures indicates that these are probably those structures which the five-year-old should be generating appropriately to be considered on a comparable level of language development with his peers.

ACKNOWLEDGEMENTS

When undertaking a project such as this, one realizes how very little could be accomplished without the help and support of others. The author wishes to take this opportunity to express her gratitude to those who helped to make this paper a reality.

She wishes to extend her thanks to Dr. Wayne Thurman and Dr. Jerry Griffith for their advice and guidance during her graduate work and as members of the thesis committee.

The author wishes to express her appreciation to the faculty, staff, and students of the Speech Pathology department for the friendship and support which made graduate work somewhat easier. The author also gratefully acknowledges the help of Leonard Amaldt in setting up and repairing electrical equipment utilized in this investigation.

She also wishes to thank Dr. Donald Gill, Mrs. Ruth Walther, and the ten children who served as subjects for this study. Their time and willingness to cooperate is greatly appreciated.

To two very special people, Nancy Keenan and Joe Luttrell, appreciation is expressed for the encouragement, confidence, and friendship that is so important during graduate work.

And finally, a special "thank you" to Dr. Lynn Miner, who served as thesis advisor, for the hours of explanations and suggestions, for his unending patience, and for helping this writer to laugh when it didn't seem possible.

TABLE OF CONTENTS

LIST OF TABLES

Chapter I

Statement of the Problem

The increasing concern of the speech pathologist with the child labeled "language-delayed" has brought to light many new theories and many new unsolved problems. In an effort to resolve some of these problems, the competence-performance dichotomy has recently been introduced and refined by Chomsky and others. In attempting to define what it is that a man must know in order to speak a language, Chomsky states:

> ...a person with command of a language has in a way internalized the system of rules that determine both the phonetic shape of the sentence and its intrinsic semantic content - he has developed what we will refer to as a specific linguistic competence. (1967, pg 397)

Thus there appears to be a set of rules underlying man's use of language. McNeill (1970) points out, however, that this competence is an abstraction and therefore cannot be directly measured. Consequently, diagnosticians must rely on judgments of competence that are based on linguistic performance.

Although Chomsky's concept has been informative in explaining how man has systematized a set of rules for sentence structure and

content, its usefulness is questionable in fully accounting for what a child has acquired when he has the ability to communicate with others. It does not define competence to the extent that it will account for all the child acquires in his development of language. Specifically, it fails to explain how a child is able to apply his linguistic knowledge to a large variety of communication situations. From this viewpoint, it seems necessary to formulate a broader concept of competence before attempting to make any judgments from performance. Hymes (1966) terms a more inclusive theory "communicative competence."

According to this concept, communicative competence for use of language consists of at least two primary attributes, namely: (1) linguistic competence, which governs sentence construction ability according to the grammar of the language, and (2) situational competence which selects sentences in relation to the speaking situation. Hymes argues that the situational competence is a part of the same developmental matrix as linguistic competence:

> ...Within the developmental matrix in which knowledge of the sentences of a language is acquired, children also acquire knowledge of a set of ways in which sentences are used. From a finite experience of speech acts and their interdependence with sociocultural features, they develop a general theory of speaking appropriate to their community, which they employ, like other forms of tacit cultural knowledge (competence), in conducting and interpreting social life (1966, pg.5).

Thus Hymes is theorizing the presence of a rule-governed ability in the child to apply linguistic rules to situations, as well as an ability to acquire and use linguistic rules for sentence structure and content.

Cazden further explains:

> Human ability to 'interpret a sentence' frequently must go beyond recovery of the literal meaning ('beyond' in the sense of further removed from the actual perceptible sentence) to an inference about the intent of the speaker. The knowledge that makes this possible is not knowledge of language alone; in addition to linguistic rules, our tacit knowledge must include sociolinguistic rules which specify linguistic output or conversely, the interpretation of linguistic output, in terms of categories of social variables such as sex, age, relative rank, social situation, and so on. This more inclusive knowledge Hymes has called 'Communicative Competence.'

If one accepts this concept of competence, it then becomes clear that the goal of linguistic diagnostic efforts is that of assessing not merely a child's linguistic competence, but his communicative competence. Diagnosticians have no alternative at this point in the profession but to sample performance and make observations and judgments of competence from this. However, a recognition of a broader concept of competence is a plea for more controlled and sophisticated methods of sampling performance.

Typically, to analyze expressive language behavior, a language sample is obtained from the child, subjected to some kind of linguistic measure, and compared to normative data, if available Following this analysis, educational and remediational procedures are begun, if deemed necessary.

At least four variables have now been identified which should be controlled in sampling language behavior, these four being : the measure,

the examiner, the stimulus, and the subject. (Miner, 1970b)

The language measure as a variable has been of concern for many years to those wishing to make accurate linguistic analyses. There has been much dissatisfaction and doubt about such widely used measures as the Mean Length of Response (MLR) and the Structural Complexity Score (SCS). (Cowan, et al., 1967; Minifie, Darley, and Sherman, 1969; Shriner, 1968). Recently a new language measure, the Length Complexity Index (LCI) has been developed. The reliability (Barlow and Miner, 1969) and validity (Hon, 1970) data now available make this instrument a logical choice for linguistic analysis.

The subject variable is of an intrinsic and an imposed nature. That is, the testing situation will have an effect upon the subject and produce variability, but there is also naturally present much variability within a group of subjects. Therefore, if the investigator selects a random sample from a population, it is expected that there will be much variability as to age, sex, IQ, physical make-up, etc. The investigator must identify the types and sources of variability within his population of subjects. These are then allowed to vary randomly, or they are carefully controlled by matching of subjects as to specific intrinsic variables.

If our ultimate purpose in sampling language behavior is an assessment of a child's communicative competence, the examiner and the testing environment become vital variables. These determine the

situation the child finds himself having to cope with and , hopefully, communicate within.

After defining communicative competence, it appears imperative that the importance of the examiner and the stimulus in assessing communicative competence be recognized. Since in observations of language behavior a child's situational competence for that certain situation (i.e., examiner, testing environment, stimulus) is also being observed, it is vital that we attempt to assess the effects of different situations on the child's verbal output.

Labov (1969) dramatically demonstrated this point in a study of nonstandard English. In trying to elicit a truly representative language sample from Negro children, it was discovered that the examiner and the setting made a great deal of difference. Only very restricted language samples were obtained when the examiner was a white man asking the child to talk about a toy fire engine that he set before him. Labov points out that if this sample is to be taken as a measure of the child's verbal capacity, it must be as only his capacity in a hostile, threatening situation. When interviewed by a Negro examiner asking the child to talk on subjects which were of seemingly great interest to older boys (fighting), only minimal responses were obtained. The same was true when the examiner switched to a more neutral subject (television). However, when the Negro interviewer brought in potato chips and the child's best friend, sat down on the floor with the boys (thereby reducing the height

imbalance), and introduced taboo topics and words into the conversation, a representative, very complex, language sample was obtained from this child.

Labov (1969, pg. 11) impresses his finding upon the prospective interviewer with this statement:

> The power relationships in a one-to-one confrontation between an adult and a child are too assymetrical.

He does not imply by this that no child will talk when alone with an adult, but he goes on to say:

> the social situation is the most powerful determinant of verbal behavior and an adult must enter into the right social relationship with a child if he wants to find out what a child can do.

Thus it seems clear that the stimulus used in sampling language behavior does have a noticeable effect on the final interpretation of the child's communicative competence. This will depend on how he perceives that situation, his pre-test experience with it, and his knowledge about and interest in it.

Despite the evident importance of the stimulus variable, a lack of concern with it is shown by the scarcity of recent research done in this area. Studies by Wilson (1969), Mintun (1968), Strandberg (1969), and Miner (1970) compose the bulk of this research. The proposed investigation is considered as a systematic continuation of the research done at Eastern Illinois University on the nature of the stimulus variable.

The methodology and the stimuli chosen to evoke language samples by investigators in prior studies have been many and varied. Some of these methods have included : (1) Toys, (2) Books, (3) Children's Appreception Test cards (CAT) and the Blacky pictures, (4) Recording of the child's spontaneous verbalizations in free-play situations with peers, (5) Magazine cover pictures, (6) Reading readiness material, (7) Picture Story Language Test (PSLT) picture, and (8) Photographs of the child in his natural environment.

All too often there have been no criteria set for the selection of stimulus items other than the fact that the examiner thought they would be of interest to young children.

The language measures have also varied through the research. Some of the analysis methods used have been : (1) MLR, (2) SCS, (3) Mean Length of the Five Longest Responses (ML_5R), (4) Number of One word Responses (N_1WR), (5) Total Number of Words (TNW), (6) Number of Different words (NDW), (7) Spontaneity Index, (8) Transformational Analysis, and (9) LCI.

Only three studies have concerned themselves directly with the question of stimulus effect on verbal output (Cowan, et al., 1967; Mintun, 1968; Strandberg, 1969).

Cowan, et al. (1967) examined the MLR as a function of examiner, stimulus, and subject. Their conclusions were stated as follows.

> Like the now discredited assumption concerning the magnitude of IQ scores, the implicit assumption that

> the magnitude of MLR is a property of the subject independent of his setting should be permanently discarded.

Mintun compared the effect of three different stimulus media on evoked language samples for educable mentally retarded children. The stimulus methods used for comparison were toys, colored still pictures of the toys, and short motion pictures of objects representing the toys used. The language samples were subjected to these language measures: MLR, TNW, NDW, and LCI. She found no significant differences with the MLR. Toys and films gave equivalent LCI scores which were significantly higher than those from the still pictures. Toys elicited a statistically significant higher TNW and NDW than either films or pictures. This study demonstrates that the stimulus medium is highly related to the language measure applied.

Strandberg performed essentially the same investigation on a population of children of "normal" intelligence. She did not find a significant difference among the three stimulus media, except that toys and films were significantly higher than pictures in regard to TNW and NDW. This finding is of little consequence, however, since it has been demonstrated that the TNW and NDW measures are highly unreliable (Minifie, Darley, and Sherman, 1963). Strandberg pointed out in a comparative table of recent investigations that the LCI was especially sensitive to the quality of the stimulus.

Since the time of these investigations, new techniques for evoking language samples have been discovered. One of these is a series of

15 verbal directives to which the child is asked to respond. These verbal directives were developed to aid the examiner in gathering normative data for the LCI. Auditory stimuli were chosen as the preferred method of evoking language samples due to the many variables inherent in visual stimuli and the lack of specific information regarding the effects of these variables on verbal output. Speech pathologists and nursery school teachers were asked to submit comments or questions they felt were likely to evoke representative responses from five year olds. A total of 70 verbal directives were collected and these 70 were then presented to a panel of observers for scaling by the psychological scaling methodology of equal appearing intervals. They were asked to scale the stimuli on "verbal directive appropriateness" which was defined for them as the "likelihood of evoking representative language samples from five year old children." Mean scale values were computed and the 15 stimuli with the highest scale values constituted the verbal directives to be used for evoking samples. It has since been shown that oral language samples can be evoked from children when stimulated in this manner (Miner, 1970; Alcorn, 1971).

Another new technique that is now being explored comes from research in the area of Visual Literacy. With this technique, the child is trained to use a camera and is given the camera to take home and take pictures of anything he wishes. After the pictures are developed, the child sits down with the examiner to see his pictures for the first time,

and he is asked to explain them to the examiner. Research by Strandberg and Griffith (1969) has shown that with this method language samples are obtained that contain long and structurally complex responses. Fransecky (1970) attempts to explain the occurrence of these complex responses by reasoning that the camera is providing the child with a fusion with the present: "His very internal life 'turns on' with each new picture...." In other words, Fransecky is noting that children value their pictures; they have an investment in them. To communicate their meaning through language to someone else is thus very important and enjoyable.

The modern age of electronics has now made it possible to sample language behavior with no examiner or human interference present. This methodology is possible through the use of radio telemetry. Hoshiko and Holloway (1968) have demonstrated its utility in collecting verbal data from a preschool child, utilizing a small transmitter, an FM tuner, and a tape recorder. After the child was familiar with wearing a harness and a dummy instrument, the transmitter and microphone were put on him and recordings were made throughout the day in half hour segments. This sample was analyzed as to initiatory speech and responsive speech. Number of sentences and mean sentence length were also obtained. But the main objective of the study was to demonstrate the feasibility of a telemetry system for sampling language.

Thus it can be clearly seen that there are in existance an abundance of methods for sampling language. Some of these methods seem to be

used because they are traditional; others because they are convenient and simple. The development of the newer methods demonstrates a somewhat revived interest in the stimulus variable.

In summary, the following points should be noted in relation to sampling expressive language behavior:

1. The concept of competence must be revised if there is to be an explanation of how a person is able to use language in many different situations. A more inclusive theory than Chomsky's linguistic competence is that of Communicative Competence which involves both linguistic competence and situational competence. Judgments of performance from which assessments of communicative competence are derived must consequently be thought of as judgments of linguistic performance in that situation; the effects and limitations of that situation must be taken into account.

2. In sampling expressive language behavior the "situation" involves the examiner, the testing environment, and the stimulus, and their resulting interactions. The stimulus variable and its effect on verbal output has often been overlooked or minimized in research and in clinical practice.

3. Recently three new stimulus methods for sampling language behavior have been developed. These methods involve the use of verbal directives, child-generated pictures, and a radio telemetry system.

4. With the realization that we are assessing communicative competence rather than merely linguistic competence, and with the development of the newer methodologies, there comes an obligation to assess the effects of the stimulus situation upon performance. As far back as 1946, McCarthy published this caution:

> It is extremely important therefore, in comparing language studies and in setting up experimental situations for future investigations, to control the situation with great care, to make comparisons only of situations which have been shown to be comparable, and to generalize regarding language development only for the specific situation in which the data have been collected (pg. 596).

5. It would be ideal to perform all diagnostics for language by obtaining a sample of the child's verbal output in several different situations. Unfortunately, this is not feasible since time, equipment, and personnel are usually limited. Therefore, the recognition of the probable effects on judgments of communicative competence of the situation and the methodology utilized in sampling language behavior obligates the researcher and the clinician to be aware of new methods and to make comparisons between different stimulus situations.

Statement of Purpose

The purpose of the proposed investigation is to compare four different methods of evoking expressive language samples from children. These four sampling procedures will function as the independent variables while obtained LCI scores will serve as the dependent variables for this investigation. The scores obtained by the different methods will be compared and differences will be further evaluated as to grammatical structures present.

The questions to be posed at the outset of this study are as follows:

(1) Do statistically significant differences exist among obtained total LCI scores for the following procedures for evoking child language samples:

   a. Toys
   b. Verbal Directives
   c. Child-generated Pictures
   d. Radio Telemetry

(2) If differences exist, are they manifested in:

   a. Noun Phrase I index
   b. Verb Phrase I index
   c. Noun Phrase II index

(3) What is the frequency of occurrence of the obtained grammatical structures from the sampling procedure yielding the highest LCI scores?

Chapter II

Review of Related Literature

The purpose of this chapter is to review procedures for obtaining language samples from children. The thrust of this critical review is to emphasize that the prevailing methodology has often been haphazard, uncontrolled, or crudely reported. Often there have been no criteria for the selection of stimulus items; other items have been chosen because of tradition or convenience. The ramifications of this kind of methodology may be perhaps greater than has been realized.

The Use of Pictures in Sampling Language

There has been vast utilization of different types of pictures as stimulus items for eliciting language samples from children. Unfortunately, the effects of various aspects of visual stimuli, such as color, action, size, etc., have not been assessed. There is a need for insight into how these features may stimulate or inhibit verbal output. The following section discusses the use of pictures in sampling language. It is organized as to the various types of pictures that have been utilized. These include: (1) Psychological projective test pictures, (2) Adult-generated photographs of children, (3) Popular magazine illustrations, (4) Reading readiness

materials, (5) Motion pictures, (6) Child-generated photograph sequences, and (7) the Picture Story Language Test picture.

Psychological projective test pictures. With seemingly little rationale, pictures from psychological tests such as the Children's Apperception Test (CAT) and the Blacky Pictures have often been chosen for use as stimulus items. Winitz (1959) utilized one card, #7, from the CAT to elicit verbalizations from a population of 150 kindergarten children. This study was designed to investigate whether previously reported small differences favoring female children in language skills are chance differences. All language samples were elicited in the child's home, either in a playroom or in his bedroom. Winitz found no significant difference between males and females in language skills with his population. In contrast, Miner(1970) found with his population of five year olds (N = 300) that differences did exist between males and females favoring the female in oral language skills. Whether differences between these studies are due to differences in sample size or stimuli is unknown. Nevertheless, it is reasonable to hypothesize that the effectiveness of the CAT card as a stimulus item is low in comparison with questions that require the child to talk about people and situations in his immediate environment. Even though true sex differences may exist in terms of language ability, they may be slighted with the use of an ineffective stimulus item.

Siegel (1962) utilized the entire set of CAT cards in obtaining samples from older institutionalized mentally retarded children. The purpose of this investigation was to compute the interexaminer reliability of the MLR.

Transcripts were prepared from tape recordings by two different secretaries with prior training in the task, and these composed the two sets of data for analysis. Correlations were computed to determine agreement between the two typists. High correlations ($r = 0.94$) were obtained, and it was concluded that tape recordings provide a reliable and practical way of obtaining samples and that persons not in the field of speech pathology may be trained to prepare transcripts for analysis.

Minifie, Darley, and Sherman (1963) investigated the temporal reliability of seven language measures (MLR, ML_5R, N_1WR, Standard deviation of response length, and NDW/TNW). In obtaining language samples, three sets of pictures were used as stimuli, one set being pictures from the CAT. The other sets of pictures were not specified as to content and were stated only to have been "judged of interest to children of the ages 5.5 and 8.0 years." A 50 response language sample was elicited on three separate occasions (no more than one day apart) in the child's home. Using the intraclass correlation coefficient, correlations ranging from .52 to .82 were obtained, indicating low temporal reliability at both age levels. This probably also indicates that the reliability, or the day to day effectiveness, of those pictures as stimulus items was also very low.

Adult-generated photographs of children. Povich and Baratz (1967) utilized the CAT cards in their study of the language development of twenty Negro Head Start children. They also employed black and white photographs of the child and his immediate environment. The examiner spent

several days in the classroom so that the children would become familiar with her, and she took a good deal of time in establishing rapport with the child before the sample was taken. Responses were analyzed using Lee's Developmental Sentence types and Menyuk's research on normal language acquistion. It was found that the lower class child is using a qualitatively different language system than the middle class child. His language was found to contain many structures that are considered restricted when compared to standard English usage. However, these forms are acceptable in the lower class Negro dialect and indicate a level of syntactic development. This investigation vividly illustrates the flaw in viewing the differences in lower class and middle class language structures as deficiencies rather than as mere differences.

The stimulus variable is seemingly so unimportant in some studies that the investigator fails to report any details about the sampling procedure. In an investigation of the communication skills of children with cleft lip and/or palate, Morris (1962) merely stated that toys and pictures were used to elicit samples. No information was given about the selection of the stimulus items or about the methods used in presenting the stimuli to the child. All responses were recorded in longhand by the examiner; no reason for utilizing this method over a tape recorder was given. Responses were analyzed as to MLR, ML_5R, N_1WR, SCS, and NDW.

Popular magazine illustrations. At a time when it was beginning to seem that no one was aware of any possible effects of the stimulus

variable on verbal output, Cowan, Weber, Hoddinott, and Klein (1967) designed a study to investigate the effects of the stimulus, examiner, and subject upon the MLR. They chose to construct a set of ten pictures from a popular magazine cover for stimulus items. Although one purpose of the study was to assess examiner effects, only two examiners, both male, elicited samples; the procedure used to elicit samples was not standardized. Ninety-six subjects at the age levels of five, seven, nine, and eleven years were tested. Despite the methodological flaws in this investigation, it did serve to cast doubt upon the assumption that the obtained MLR is a function of the subject independent of his setting. In other words, situational competence as well as linguistic competence is being assessed in the testing situation.

Reading readiness materials. Reading readiness pictures have supposedly been developed to be of particular interest to young children. Some investigators have chosen to construct sets of these pictures to use as stimulus materials. James (1968) assembled a set of reading readiness pictures for use in an evaluation of transformational skills of culturally advantaged and disadvantaged children. This paper contains a comprehensive explaination of the different transformations used by the children in the study.

Barlow and Miner (1969) investigated the temporal reliability of the LCI and employed a similar set of reading readiness materials as the James study. The LCI was found to have high temporal reliability (.80)

in comparison with the 0.65 found for the MLR. In regard to the effectiveness of reading readiness materials as stimuli, Barlow points out that all children may not have interest in these pictures even though the experimenter would judge them interesting to children.

Motion Pictures. The effect of moving pictures as stimulus materials has also been assessed . As mentioned earlier, Mintun (1968) compared three different language sampling procedures on a population of mentally retarded children. The three sampling procedures were: toys, still pictures of the toys, and moving pictures of objects representing the toys. Employing the MLR, TNW, NDW, and the LCI, she found that the MLR yielded no significant differences. Toys and films yielded equivalent scores which were significantly higher than those of still pictures with the LCI measure. It was noted that most of the children tended to describe the action taking place in the moving pictures. Therefore, the frequent use of the present participle probably tended to skew the obtained scores, since the use of this form of the verb is scored as an extra point on the LCI.

The Strandberg study (1969), as previously cited, essentially replicated the Mintun study on a population of 30 four and five year old children of normal or above average intelligence. Toys, still photographs of the toys, and films of objects representing the toys were again used. Significant differences among the three stimulus media were not obtained. Strandberg does not account for the difference in results in comparison to previous studies, although she

does point out that one would expect older mentally retarded children to have different reactions to the stimuli than four and five year old normal children. One interpretation of these results that has not been hypothesized before is the possibility of examiner effect operating here. Perhaps it does not make any difference which of these three stimulus methods are utilized if the clinician is highly skilled with much experience and natural ability in working with normal children. It is felt that this should be considered as contributing to the obtained results of that study.

Story films have also been utilized to elicit child language samples. O'Donnell, et al. (1967) utilized short animated cartoons of two of Aesops fables to obtain oral and written responses from 180 children divided into groups of kindergarten, first, second, third, fifth, and seventh graders. The films were shown without the sound so that the narrator's language would not influence the child's verbalizations. Immediately after the film, each child was asked to tell the story of the film and to answer certain preplanned questions on the film. The third, fifth, and seventh graders were then asked to write the story of the film and answers to the same questions. A transformational analysis noting primarily the number, kinds, and functions of sentence-combining transformations was performed on all samples. The differences between usage at different grade levels were analyzed.

The limitations of this type of research were realistically stated by the authors as follows:

> The language samples do not necessarily show what the children would have done under other types of stimulus conditions. Nor do they give much basis for speculating about so-called 'passive abilities' - abilities to understand in listening and reading. They simply show how children at various stages of development did express themselves in a particular kind of situation. (pg. 27)

Therefore the recognition is cited that the child's situational competence for that setting may be very different than that for another setting.

Child-generated photograph sequences. In an exploration of a new area called Visual Literacy, Strandberg and Griffith (1969) designed a study to measure relationships between visual experience and verbal behavior. Six four and five year olds were trained and given the necessary equipment to take their own pictures. They took pictures on three separate occasions: (1) The children were taken into a large room inwhich toys were arranged for photographing. Each child was asked to take two pictures of each toy. After the films were developed, the examiner evoked a language sample from each child using these as stimuli; (2) Each child was given two 20-exposure film cartridges and the camera was sent home with the child over the week-end. He was instructed to take pictures of anything he wished. The developed prints were numbered so as to identify the order in which they were taken. In evoking the samples, the child was first given

the pictures in a stack and allowed to talk about them as he wished. After this, the pictures were laid out in random fashion in front of him and he was asked to tell the examiner about them again. Sequences were noted; (3) For the third occasion the experimental group was given 45 minutes of training in visual sequencing activities. Both groups again took film home and took pictures. Language samples were evoked in the same manner as in session two.

Linguistic analyses employed were the LCI, Spontaneity Index, TNW, and NDW. Results showed that: (1) The language responses were significantly longer and grammatically more complex when the child was talking about pictures made at home compared to those of the toys; (2) Training in sequencing significantly increased length and complexity of subjects' responses; (3) Responses were significantly more spontaneous when talking about pictures made at home; (4) The LCI seemed to be the most sensitive to the changes in language behavior brought about by the visual literacy training.

The Picture Story Language Test picture (PSLT). In an effort to standardize a method for obtaining language samples, Margo Wilson (1969) utilized the photograph from the PSLT. This photograph pictures a young boy sitting at a table playing with a variety of toys that are around him. Wilson used 40 subjects on the age levels of three, four, five, six, seven, eight, nine, eleven, thirteen, fifteen, and seventeen years. Standard instructions were given and tape

recordings were made. Responses were analyzed according to total sentences, words per sentence, syntax scale, and abstract-concrete scale. Reliability was assessed by retest of ten subjects. The validity criterion established was that of ranking of samples from least to most proficient in language ability. This was performed by two speech pathologists who obtained a correlation of 0.93 between their rankings of the 40 samples. From this investigation, Wilson concluded that the PSLT picture provided a valid standardized method for evoking language samples from children.

Wilson is to be commended for her efforts to resolve this problem of standardization; however, as Griffith (1969) points out, the conclusions of the study "fail in their quest for sufficiency." Conclusions that language samples obtained with any method are representative of the child's habitual performance cannot be validated until all factors are systematically varied and assessed.

It seems appropriate to note here that no investigator, with the exception of one, has specified the criteria for selection of stimulus items. In constructing a standardized test for securing samples of written language, Myklebust (1965, pg. 71) emphasized the following criteria for selection of pictures:

1. It must portray action of a type that provides as much interest and motivation as possible.
2. It must be appealing to children of school age from the primary grades through high school or between the ages of seven and 17 years.

3. It must lend itself to imaginative thinking, be conducive to writing about more than what is actually portrayed.
4. There should be a definite foreground and background.
5. The size of the picture must be standardized large enough to permit continuous viewing by eight to ten persons at once; the actual size is $10\frac{1}{2}$ by $13\frac{1}{2}$.

Although these do not apply to obtaining oral language samples, other investigators should follow this example in identification of the rationale for the selection of stimulus items.

It can clearly be seen that the use of different sorts of pictures for stimuli in sampling language has been active and wide-spread. As the variables inherent in visual stimuli and the possible effects of these variables upon the child are further investigated, it should become easier to make decisions about the use of pictures to elicit verbalization, and the investigator will not have to rely upon the traditionally crude random selection. The use of that kind of methodology certainly makes interstudy comparisons impossible. Even more importantly, it may lead to distorted impressions of communicative competence. These consequences should make this problem of imminent concern to those interested in language research.

The Use of Toys as Stimuli

McCarthy (1930) was one of the earliest investigators to study the language development of the child. She also described the use of certain toys and pictures in eliciting language samples which set a precedent for many other researchers. She recommended that to

stimulate spontaneous conversation, toys, pictures, and picture books be used. For toys, she utilized "a little red auto, a cat that squeaked, a telephone with a bell, a little tin mouse, and a small ball."

McCarthy used a book containing group or situation pictures with older children. With young children she found that an animal picture book having one central object in each picture was particularly suitable. However recent studies (Mintun, 1968; Strandberg and Griffith, 1969; Strandberg, 1969) indicate that still pictures with one central object have a restrictive influence on the child's verbal output.

In 1932, Day essentially replicated the McCarthy procedure to study the language development of twins from the ages of two to five years. The responses were recorded longhand by the author. The reliability of the scoring method was checked by having the examiner and two other speech pathologists score responses; however, no intraexaminer reliability was computed for recording or scoring. Day noted that sometimes family members insisted on being in the testing room while the children were playing. This usually would either encourage or interfere with spontaneous language. McCarthy's procedures for functional analysis, construction analysis, and a word analysis were followed. Day's results indicated that these twins were retarded in language development as measured by each of these analyses.

Davis (1937) made modifications of the McCarthy stimuli in order to assess linguistic skill in twins, children with siblings, and those that have no siblings. She chose objects of special interest to boys such as cowboys, indians, wagons, etc. It was assumed that girls would also be interested in these. Davis also used pictures of ships and of simple school situations, but resorted to these only when toys failed to elicit responses. In terms of length, complexity, and grammatical correctness, she found a significant sex difference in favor of the girls, in spite of a situation which was unfavorable to them. Due to this situational prejudice, the magnitude of the difference may have been greater than indicated by the results.

Many other investigators have chosen to use a variety of toys as stimulus items along with other stimulus methods such as pictures, role-playing, etc. (Hahn, 1948; Morris, 1962; Cazden, 1965; Mintun, 1968; Strandberg, 1969)

The researcher using toys as stimulus materials faces the problem of trying to select toys that will be stimulating to all children in the population. This criterion makes it difficult to duplicate other studies since different children have diversified interests in toys.

There have been only two studies which compared the use of toys as stimuli with the use of other materials (Mintun, 1968; Strandberg, 1969). If the wide use of toys as stimulus items both in research and in clinical practice is to continue, there is a need for

more research similar to these studies. Research should be designed so as to make direct comparisons between toys and other less traditional methods as to yielded linguistic performance.

Role-Playing as a Sampling Technique

Role-playing is a techniq ue in which the examiner sets up a situation for the child and provides him with play materials and roles to pretend. This has often been used in research to attempt to elicit acceptable language samples.

Paula Menyuk (1961) designed a study to assess the usefulness of Chomsky's tripartite model for describing children's grammar. To obtain an adequate language sample from these nursery school children and first graders, she tape recorded speech in three different situations: (1) Responses to the picture from the projective test, The Blacky Pictures; (2) Conversations with the examiner with her employing some questions from the test manual and some of her own choosing, and (3) Conversations in a role-playing situation in which the children (three children in each play situation) were told that they were to pretend to be a family just getting ready for the day. This was recorded for a 15 minute time period. Written recordings were taken in the classroom to check for the use of sentence structures in that situation that might not have been used in responses in the testing situations. The language sample from each child was analyzed according to Chomsky's technique of transformational analysis. Menyuk realized that the high mean IQ

range (119-146 as measured by the Peabody Picture Vocabulary Test) restricted the data comparison as to differences in syntactic structures present with different IQ ranges. However, it is also possible that she would not have found all basic adult structures present with nursery school children of a more average IQ range. Further research is needed in this area.

For her doctoral dissertation, Cazden (1965) designed an investigation to determine whether a child gets more benefit from a particular type of interaction with adults, expansion, or more from simply much exposure to interaction with adults. Subjects were divided into two groups and each child received 30-40 minutes of exposure each day for three months. Equipment used in the study were divided into three categories according to their usefulness in evoking verbalizations from these 28-38 month old children. Montessorri type materials (color cone and simple geometric puzzle) comprised part of the first category. The child could come in the room and immediately begin successful work without interaction with the examiner. These toys were used to establish rapport. Plasticiene and blocks also comprised the first category, and although through their lack of structure, verbalization could be encouraged, it was often too difficult to understand the child because of the wide range of possible topics.

The second category was composed of dolls, and house-keeping and dress-up materials. With the use of these items, verbalization

was plentiful and the topic usually easily comprehended.

Books were used in two different ways. In the group receiving the expansion exposure, the pictures in the book were used to talk about. In the other group, the books were simply read to the children each day. Books were chosen that had simple, well-formed sentences, no continuous plot, and action pictures. Obtained data were analyzed as to mean length of utterance, Noun phrase index, verb complexity index, copula index, sentence-type index, and sentence imitation test.

Although the role-playing activity did not compose the entire sample in either of these studies, verbalizations recorded during these activities have been taken as representative of the child's true linguistic skill. The investigator should consider the possibility of obtaining much imitative language during these activities. Language used by a child while pretending to be a mother getting her children off to school may be very much like that used by the child's own mother every morning. These responses may therefore be more elaborate in syntax and vocabulary than the child's routine language usage.

The Utilization of Question and Answer Formats

Several investigators have chosen to directly question the child and record his responses to these questions. Some of these procedures involve questions about certain stories or toys that have

been presented to the child; others involve carefully chosen questions to the child about himself or his environment.

Williams and Naramore (1969) attempted to determine whether statistically reliable social differences did exist between the degree of syntactic elaboration in the speech of Negro and white fifth and sixth grade children. Their language samples were obtained from the Detroit Dialect Study (Shuy, et al., 1967). For that study, interviews were conducted in the children's homes. Each child was asked to pronounce word lists, read aloud, name items, and provide grammatical contrasts. Fourty-five minutes were devoted to prompting the child to talk freely about certain topics. Discussions from three of these topics were selected for this analysis. Questions to the child were: (1) What kinds of games do you play around here? ; (2) What are your favorite television programs?; (3) What do you want to do when you finish school?. Unfortunately the authors do not state why responses to these particular questions were chosen. Perhaps children's responses to these questions were longer and more elaborate, or perhaps they were more nearly standard in length, etc., from child to child than responses to other questions. However, this is only conjecture. A structural description of the responses to these questions was performed. Results indicated that reliable social class differences do exist on a variety of indices. Mainly, children from a higher status sample tended to employ more, and more

elaborated, syntactic patterns.

In her book, Language Disorders of Children, Mildred Berry (1969) suggests the use of a picture-story technique for evaluating the conversational speech of a child five to eight years of age. With this method one picture-story is presented in detail to the child. Eleven 4 X 6 line drawings accompany the story and are laid out in front of the child as the examiner tells him a story about them (a story and accompanying pictures are illustrated in the book, pg. 243). The examiner stops at a certain point in the story and asks the child to finish it, with the pictures to help him. If the child does not respond, specific questions are asked of him as prompts. No language age is obtained. However, she suggests a comprehensive evaluative description of the child's conversation during the story through the use of a critique outline, which is also provided in the book. The outline includes such things as imaginative description, two levels of interpretation, use of structure words, grammar and syntax, and articulation, to name a few. This language sampling technique could possibly be utilized with other linguistic measures except in those cases where the child finally finishes the story by merely completing sentences made by the examiner. It would not seem to be useful for the child who may be slow intellectually, since even with the pictures, a representative language sample would require some imagination and inventiveness on the part of the child.

The most recent effort in the quantification of language development is the Developmental Sentence Scoring (DSS) procedure (Lee and Canter, 1971). This is a clinical procedure for estimating the progress of children enrolled in language training. Based on a developmental scale of syntax acquisition from Northwestern University studies, the procedure gives weighted scores to a developmental order of pronouns, verbs, negatives, conjunctions, yes-no questions, and wh-questions. The authors suggest a language sampling procedure in which the child is alone with an examiner; stimulus materials should include any toys, pictures or social play which holds the child's interest and allows maximum syntactic performance. Qestions such as "What happened next?" or "What would happen if...?" are to be used by the examiner. The success of the sampling procedure is highly dependent upon the skill of the clinician. The scoring procedure is very complicated, time-consuming, and places a heavy emphasis on grammatical correctness. When reliability and validity of the DSS are established, it may prove to be a useful and thorough tool for quantifying clinical progress. Its usefulness as an initial indicator of language development level would appear to be somewhat restricted due to the heavy penalties for grammatical errors. The DSS procedure seems to have been developed on a criterion of grammatical accuracy rather than one of structural complexity. This method, therefore, does not allow the examiner to make decisions about dialectal differences. Dialect differences (i.e., different

than standard English usage) are automatically labeled as deficiencies by the use of the DSS procedure. Thus the child who is functioning at an adequate level of language development for his age, but uses non-standard English would seem to be unduly penalized with the DSS system.

As previously discussed, Miner (1970) assembled a set of 15 verbal directives for use in collecting language samples when normative information was gathered for the LCI. With this technique, the examiner and the child are seated together, and the examiner randomly presents these 15 questions to the child. The examiner may use "Tell me more" as a prompt to elicit further verbalization. The fact that all children will have some experiential base from which to respond to questions such as these may perhaps enhance the child's situational competence during testing.

Recording in Free-Play or other Non-examiner Situations

In an attempt to avoid examiner influence or interference, a number of investigators have chosen to record the child's spontaneous conversation in play at school or at home.

In 1926 Smith investigated the development of the sentence in young children. The child was allowed to play in small groups at nursery school and the examiner sat in the room and made written recordings of the subject's utterances in a one-hour period. Since only one examiner made the recordings for each child, reliability

of the written recordings is questionable.

In an investigation of the English learning skills of Hawaiian children, Smith (1939) states her objection to formal procedures such as McCarthy's utilization of toys and pictures to elicit verbalization:

> It was felt that the language used by the observer would influence too much that used by the child and the purpose was to learn what was the most natural manner of speech for the children in their homes. (pg. 141)

Therefore, written recordings were then made of everything the child said in a variable length of time in two situations, at kindergarten and at home. The question of recorder reliability applies in this study also.

Hahn (1948) recorded first grade children during a "Show and Tell" period in the classroom. She then elicited a language sample from these same children using small objects and toys "such as those as are commonly used by speech correction teachers". She also asked the children to tell a story about "an interesting pretested picture". With this design she found that the children used sentences with a mean length of only 6.85 words in the situation with the examiner, but used sentences with a mean length of 9.84 words during the audience situation of "Show and Tell". Her results must be interpreted with caution as the size of the language samples obtained in both situations were small and were not comparable. She does make an

interesting comment on what we now view as the influence of the child's situational competence:

> The length of the child's total response and of his sentences and the completeness of his sentence structures depend more extensively on the situation in which he speaks and the topic about which he talks than has been realized. (pg. 365)

Following the publication of Language and Thought in which Piaget (1926) discussed the child's egocentric and socialized speech, there seemed to be an upsurge of interest in the effect of the situation on the child's verbal output. Therefore in the 1930's and the 1940's there were several studies which were designed to assess these effects (McCarthy, 1929; McConnon, 1935; Williams and Mattson, 1942; Janus, 1943). Most of these investigators attempted to record (by written method) the child's conversations during different situations (outdoor play, indoor play, nursery school, home, peer groupings, child-adult groupings). Obtained samples were compared on such measures as length of response, spontaneity, socialized speech, and day to day consistency.

In view of today's more sophisticated methods of research and of linguistic analyses, these studies provide little valid and conclusive information. They were, for the most part, poorly managed as to control of variables and checks on reliability. The inclusiveness of these studies and the lack of research in this area in recent years points out the urgent need for further investigation.

In conclusion, the intent of this chapter has been to affirm the need for further research into the effect of the stimulus variable on verbal output. It has been shown that many types of stimulus situations have been utilized to collect language samples. This review suggests that tradition and convenience have appeared to be the main criteria for selection of stimuli. There have been few inquiries as to the effect of this methodology on the child's situational competence.

Although very few studies have been designed to compare directly the effects and usefulness of different stimulus items with children, a quasi rank-ordering of stimuli can be formulated from observations of different sampling techniques. There are obvious limitations on the validity of this rank-ordering since different examiners, measures, and stimuli have been used in different investigations. Nevertheless, it appears that the different items may rank-order themselves in the following manner according to ability to stimulate verbal output:

1. Child-generated Pictures
2. Verbal Directives
3. Toys
4. Films
5. Still Pictures
6. Reading Readiness Material

There is at this time an urgent need for research evidence to support, refute or rearrange this rank-ordering. As has been shown in this chapter, interstudy comparisons (c.f. Table I) are virtually impossible at this point because of the uncontrolled stimulus

situations. It is also probable that indications of communicative competence are being distorted due to the unknown influence of the stimulus situation on the child's situational competence. Noting these limitations on present knowledge, the value of research to compare directly stimulus effects on verbal output becomes increasingly clear.

Table I. - Summary of investigator(s), stimulus methods, and language measures used in language studies pertinent to the present study. Abbreviations of language measures: mean length of response (MLR); number of one word responses (N_1WR); number of different words (NDW); structural complexity score (SCS); mean of the five longest responses (M_5LR); total number of words (TNW); mean standard deviation for mean length of response (MSD); standard deviation of response length (SD-RL); development sentence type (DST); length complexity index (LCI); noun phrase index (NPI); verb complexity index(VPI)

Investigator	Stimuli	Language Measure
1930 McCarthy	Picture books = animal pictures and Mother Goose rhymes Toys = auto, cat, telephone, mouse music box, ball	Length of response Complexity of sentence structure, function of response, proportions of various parts of speech
1932 Day	Similar to McCarthy's	Same definitions, classifications, methods & analysis as McCarthy
1937 Davis	Picture books = ships school situations Toys = similar to McCarthy's. Added cowboys & indians	McCarthy procedure Clarified rules for sentence class
1939 Smith	Written recordings of children in one-hour free-play situation with peers	Same as above

Table I - continued

Investigator	Stimuli	Language Measure
1948 Hahn	Small objects & toys Pretested picture Recordings of children during a "Show & Tell" period at school	Same as Smith
1959 Winitz	CAT card, # 7	MLR
1961 Menyuk	Blacky pictures conversation with examiner, peers classroom situation	Transformational Analysis
1962 Siegel	CAT cards	MLR
1962 Morris	Toys & Pictures	MLR, MDS, N_1WR M_5LR, SCS, NDW
1963 Minifie, Darley, Sherman	Three sets of pictures: CAT cards & two constructed by the examiner	MLR, SD-RL, NDW SCS, TNW, M_5LR, N_1WR
1965 Cazden	Toys (see text) Books	MLR, NPI, VCI, Copula Index, Sentence-type index, sentence imitation test
1967 O'Donnell Griffin Norris	Animated cartoons of two of Aesops fables	Transformational Analysis
1967 Cowan Weber Hoddinott Klein	Ten pictures constructed from a popular magazine cover	MLR
1967 Povich Baratz	Photographs of child in natural environment	DST, transformational analysis

Table I - continued

Investigator	Stimuli	Language Measure
1968 James	Set of pictures from reading readiness material	Transformational Analysis
1968 Mintun	Photographs of toys, toys, moving pictures of toys	MLR, TNW, NDW, LCI
1969 Miner Barlow	Three sets of pictures from reading readiness materials	MLR, LCI
1969 Strandberg Griffith	Photographs taken by subjects of specified toys, and of environment	MLR, LCI, NDW, TNW, Spontaneity Index
1969 Strandberg	Photographs of toys, toys, moving pictures of toys	MLR, TNW, NDW, LCI
1969 Williams Narramore	Three questions from Detroit Dialect Study	Structural description of syntax
1969 Berry	Picture-story for completion by the child	Comprehensive evaluative description on several parameters
1969 Wilson	Picture from PSLT	Total sentences words per sentence syntax scale, abstract-concrete scale
1970 Miner	15 verbal directives	LCI
1971 Lee Canter	Child's favorite toys, pictures or play	Developmental Sentence Scoring

Chapter III

Subjects, Equipment, and Procedure

I. Selection of Subjects

The children who served as subjects were selected from the five-year old kindergarten at the Buzzard Laboratory School on the Eastern Illinois University campus. Since all four methods for evoking language samples were used with all subjects, each child, in effect, served as his own control. Therefore, only the following three criteria were chosen for selection of a child as a possible subject:

(1) Age: the child had to be between the ages of four years, nine months and five years, three months. This range was selected since the present investigation centers on the language of children five years of age and the language measure, the LCI, was standardized on a group of five-year olds.

(2) Hearing: All subjects were given a binaural puretone audiometric screening at a level of 20 dB at the frequencies 250, 500, 1000, 2000, and 4000 Hz. Any child who failed two frequencies in either ear at this level was excluded as a possible subject. One child was excluded from the population due to a failure of the hearing screening.

(3) Articulation: Any child who was found to omit the final /s/ or /z/ was excluded as a subject. This was assessed by having the child repeat the following words after the examiner: book, books, toy, toys, wet, wets, dress, dresses. Since pluralization indicates morphological skill and is scored as an extra point on the LCI, the /s/ or /z/ omission would complicate the transcription and scoring of the child's LCI. All children in the population met this criterion.

All children in the five-year old kindergarten at the Laboratory school who met the above requirements were eligible to be chosen as subjects. From the 22 possible children, ten were randomly selected to serve as subjects. Six children from the morning session and four from the afternoon group were selected in this manner. Six boys and four girls were chosen.

II. Methodology for Evoking Samples

The following stimulus modes were utilized for comparison in this investigation:

(1) Toys
(2) Verbal Directives
(3) Child-generated Pictures
(4) Radio Telemetry

The rationale for selection of these stimuli was, in part, that none, the verbal directives, child-generated pictures, nor the use of radio telemetry as a language sampling technique has ever been directly compared with any other sampling procedures.

(1) Toys

Research by Mintun (1968) has shown that toys and films yield the

highest scores in terms of the LCI. Since the two methods seem to be equivalent as to their effect on verbal output, it was decided to use toys as a matter of convenience for this study. This also eliminated decisions previously reported about film length and quality. It was decided to include toys also because of the widespread use of toys by speech clinicians as stimuli to elicit language samples from children (McCarthy, 1930; Templin, 1957; Morris, 1962; Cazden, 1965).

Those toys utilized in research by Mintun (1968) and by Strandberg (1969) were again used in this study so that interstudy comparisons could be made. The toys employed as stimulus items were:

1. Horse	4. Fire Engine	7. Telephone
2. Dog	5. Cash Register	8. Car
3. Airplane	6. Tractor	9. Piano

The child was seated at a table with the examiner. The instructions were, "I am going to show you some toys and I want you to tell me all you can about them." The toys were presented in random order one at a time to the child. Each subject was allowed to handle the toys in any manner he wished.

(2) Verbal Directives

The fifteen verbal directives employed in the investigation were developed in establishing normative data for the LCI (Miner, 1970). These auditory stimuli were included because of the elimination of the problem of the possible effect of different aspects of visual stimuli on verbal output. Verbal idrectives are also convenient as

they require no equpment and no pre-test training for the child. Furthermore, the use of certain standard questions allows for easy replication of studies involving language samples.

Each child was seated by the examiner. The questions were randomly presented to him in their original form. The questions used were:

(1) Tell me about your house.
(2) Tell me about your family.
(3) What do you and your friends like to do?
(4) Tell me about your favorite toys.
(5) Tell me about your favorite game that you like to play.
(6) Tell me about your favorite story.
(7) Tell me about your favorite TV program.
(8) What do you usually do when you get to play outdoors?
(9) If you had a whole day to do whatever you wanted, what would you do?
(10) Tell me about some pets you wish you could have.
(11) What do you do to help your mother around the house?
(12) If you could be anything in the world, what would you be and why?
(13) Tell me about Christmas.
(14) Tell me about your mommie.
(15) If you had three magic wishes, what would you wish for?

(3) Child-generated Pictures

Research by Strandberg and Griffith (1969) on the subject area of visual literacy presents a strong case for the use of child-generated pictures in obtaining language samples. For this investigation, each child was issued a Kodak Instamatic 154 camera, flashcubes, and a roll of 12-exposure black and white film. Although the Strandberg and Griffith research used only color film, it is felt that if this method be further proven to be worthwhile, the use of black and white

film would be clinically more useful, since it is less expensive and easier to develop than color film. Povich and Baratz (1967) report the use of black and white pictures of the child in his natural environment as stimuli to elicit verbalization.

In the present study the children participated in one training session on how to use a camera. The examiner conducted the training session. The children were taught how to use the wrist strap, advance the film, put on the flashcubes, when to use the flashcubes, and how to aim the camera. Each child was allowed to take one picture during the training session for practice. Each parent was sent a letter indicating what he should expect and how he could best cooperate in this research. The parents were also asked to sign release forms before the cameras were sent home with the children.

Each child was given a camera to take home three days before a language sample was to be obtained from him using this method. He returned his camera and film to the examiner the next day, and it was taken to a near-by studio for processing which required twenty-four hours. The subject was shown his pictures the next day and a language sample was elicited. The child was seated at a table with the examiner. He was given all his pictures in a stack and instructed, "Here are the pictures you took the other day. Tell me all about them." The child was allowed to handle his pictures and sort them in any method he chose. Most of the children elected to go through the pictures one

at a time, although a few children did spread the pictures on the table.

(4) Radio Telemetry

The Hoshiko method (Hoshiko and Holloway, 1968) of sampling language using a radio telemetry device was followed. Equipment utilized to carry this out included: (1) a Piezo wireless FM microphone, Model WX-127-B, (2) a Rheem Califone tape recorder, Model 70-TCP, (3) a Masterwork AM-FM Multiflex Radio.

The child was fitted with a harness designed to secure the transmitter on him. Each subject wore a harness fitted with a dummy instrument for two days during the entire period he was at school. This was done in order to familiarize him with wearing the harness. On the third day, the actual microphone was inserted in the harness, and a 30 minute language sample was recorded while the child was on the playground with his peers. This play situation was chosen for its practical aspects and because the outdoor play period is the longest period of the school day in which the child's activities are not structured by the teacher or by the available materials within the room.

In order to make recordings, it was necessary for the instrumentation to be set up on the opposite side of a fence surrounding the playground. In this way, the receiver was placed in a somewhat center position and could be kept within the range of the transmitter at most times. The examiner set up the instruments before the children came out to play and was present and visible to the children throughout the

play period. A schematic diagram of the radio telemetry instrumentation is found in the appendix of this paper.

Although some of the children were curious about the instruments and the examiner, and sometimes came over to the fence to talk, they remained for brief periods only. At no time did any child try to interrupt the recording or bother the subject's transmitter. The children who wore the dummy instruments and the microphone seemed to be unaware of having them on at most times. All children played as usual and did not give the microphone any special attention.

Because of instrumentation difficulties, it was necessary to revise the testing schedule several times. The investigator encountered problems such as dead batteries, broken wires, and various other electrical complications causing the recording efforts to fail three times. It was necessary to record subject number four three times and subject number eight twice before samples were obtained. Although it is unfortunate that the extra time was necessary, it is not considered that the samples obtained from these subjects are restricted in comparison to those from the other subjects who wore the microphone only once.

The stimulus mode and date of presentation for each subject can be found on a copy of the final testing schedule in the appendix of this paper.

Language samples were evoked from each of the ten children under all four stimulus conditions. To control for order effect, the presentation sequence for each child was randomized employing the table of random numbers. Randomization was also utilized within the stimulus presentations in regard to the toys and the verbal directives.

All samples were evoked at the Laboratory school kindergarten. Those samples elicited with the toys, verbal directives, and pictures were taken in the office of the kindergarten teacher. This office was located right off the main room of the kindergarten. Although the activities in the main room were often very noisy, none of the subjects seemed to be distracted by the noise or eager to get back to their activities.

Instructions to the subjects were standard. The examiner used only one prompt of "Tell me more" with each stimulus presentation. Verbal reinforcers used by the examiner included "uhhum," "OK," and "yes" in a tone to indicate understanding and interest. Other reinforcers that the examiner allowed herself were social reinforcers such as a smile or a head nod.

A Rheem Califone tape recorder, Model 70-TCP was used to record and transcribe all samples.

III. Examiner

The fact that the examiner can be a crucial variable has been demonstrated by Cowan, et al. (1967). Therefore, the investigator

conducted all training sessions to teach the children to use the cameras and to wear the transmitter; she elicited all language samples. It is felt that with this precaution and standard instructions and prompting for each child, examiner bias was minimized as much as possible.

IV. The Language Measure

The Length Complexity Index was utilized as the tool for linguistic analysis. Although, as already pointed out, many investigators have used the MLR, SCS, TNW, and others, recent investigations have shown the LCI to be the most sensitive of these measures to changes in language behavior brought about by the stimulus. Specifically, available reliability (Barlow and Miner, 1969) and validity (Hon, 1970) data make the LCI the logical choice for analysis.

The unit of analysis was the base structure sentence, whether complete or incomplete. Scoring procedures adhered closely to the rules from "Scoring Procedures for the Length Complexity Index: A Preliminary Report" (Miner, 1969). However, since it was deemed very important in this research to maintain high reliability, it was decided to use a corpus of 25 base structure sentences for analysis. It has been demonstrated by Miner and Griffith (1969) that a language corpus of this magnitude yields an r of 0.95 when correlated with a 50-response language sample. This high degree of precision was desired in this research. The entire language sample obtained from each child with a particular method was transcribed and broken down

into base structure sentences. A table of random numbers was then utilized to select 25 base structure sentences for further analysis.

V. Examiner Reliability

All samples were transcribed and scored by the investigator. To determine intraexaminer reliability, language samples taken from three subjects were transcribed and scored again by the examiner three weeks after the first transcription and scoring was done. A percentage of agreement index of at least 95% was taken to indicate a high level of reliability in the examiner's scoring and transcription of these samples. A percentage of agreement index of 97% was attained for transcription and 98% for scoring of the data. These two values report consistent agreement in the two analyses of these 12 samples and indicate high intraexaminer reliability.

VI. Data Analysis

The specific questions posed at the outset of this study were answered utilizing parametric statistics, since the nature of the data was interval and the appropriate criteria concerning sampling and distribution were met through this design.

Mean LCI scores and standard deviations were computed for each sampling procedure. A one-way analysis of variance was applied to assess the significance of the obtained differences. An alpha level of 0.05 was chosen as acceptable for this investigation. Since the obtained F ratio (to be discussed in the following chapter) was found

to be significant beyond the 0.05 level, six *t* tests were employed to locate the source(s) of variance, and a rank-ordering of the stimuli as to those yielding the highest to the lowest LCI scores was formulated from this. The same statistical procedures were carried out to assess whether the differences were manifested in Noun Phrase one, Verb Phrase one, or Noun Phrase two. The frequency of occurrence of the various grammatical structures in the samples from the procedure yielding the highest scores were reported as percentiles.

Chapter IV

Results and Discussion

Oral language samples were obtained from each of ten five-year-olds employing four different language sampling procedures. The procedures utilized were stimulation with toys, verbal directives, child-generated pictures, and recording of language at play by radio telemetry. The responses obtained by each of these sampling procedures were tape recorded and analyzed by means of the LCI. The mean, standard deviation, and skewness and kurtosis measures were computed from the total LCI scores for each of the four procedures. A one-way analysis of variance was performed to assess the significance of the differences among the means of the four groups. Six *t* tests were performed to determine the location and magnitude of the differences found with the analysis of variance. Six *t* tests were also performed for the noun phrase one (NP_1) index, verb phrase one (VP_1) index, and noun phrase two (NP_2) index for each procedure. A rank-ordering of stimulus methods as to the procedure which yielded the highest and most stable indications of communicative competence was determined. Finally, the frequency of occurrence of the obtained grammatical structures

from the sampling procedure yielding the highest scores was described. The intent of this chapter is to present the statistical computations and resulting interpretations to answer the questions posed at the beginning of the investigation.

Differences Among Sampling Procedures

In order to study the distribution and variability of the scores, the mean, standard deviation, skewness, and kurtosis were computed from the total scores for each language sampling procedure. The arithemtic mean enables one to characterize the average group performance. The standard deviation reports inter-subject variability. From measures of skewness and kurtosis one obtains information about the shape of the distribution in comparison to the normal distribution. Skewness is a measure of the symmetry of the distribution. Griffin (1962) states that if the computed value for skewness is greater than ± 0.50 there is considerable skewness present. A positively skewed distribution indicates a piling up of scores on the negative end of the distribution. A negatively skewed distribution indicates a piling up on the positive end. Kurtosis is a measure of the peakedness of the distribution. A value of ± 0.50 or less is acceptable representing a curve not significantly deviating from the normal curve. Leptokurtic distributions are more peaked than normal, while platykurtic distributions are flattened. Table II reports these finding for the obtained scores from the four stimulus methods.

Table II.- Mean, Standard Deviation, Skewness, and Kurtosis values for the four sampling procedures

Measure	Toys	Verbal Directives	Pictures	Radio Telemetry
Mean LCI Score	4.92	5.47	5.73	4.55
Standard Deviation	0.96	0.51	0.81	0.65
Skewness	-0.48	-0.43	-0.06	0.05
Kurtosis	-0.83	-0.67	-1.22	-1.10

An examination of Table II reveals that the sampling procedure utilizing radio telemetry yielded the lowest group mean and a fairly large standard deviation relative to that of the lowest standard deviation, 0.51, for the verbal directives. The distribution is symmetrical as shown by the skewness value, but platykurtic as shown by the high negative kurtosis value.

Toys yielded the third highest group mean, with the largest standard deviation value of the four. The symmetry of the distribution is close to normal, but it is also platykurtic.

The verbal directives procedure yielded the second highest group mean, with the standard deviation for this procedure being the lowest value of the four. The standard deviation value indicates that there was less response variability produced with the use of the verbal directives than with the use of the other three methods, and thus there is the probability of a lower standard error of the measurement score. The skewness of this distribution also shows it to be symmetrical,

and the kurtosis value indicates a platykurtic distribution. When considering both skewness and kurtosis, the obtained values for the verbal directives more closely approximate a normal distribution than any of the other three methods.

The child-generated pictures yielded the highest group mean but also had a relatively high standard deviation value indicating a great amount of response variability. The distribution was symmetrical and platykurtic.

It can be seen from Table II that differences do exist among the obtained LCI scores. To assess the significance of these differences, a one-way analysis of variance was computed. The resulting F ratio was significant beyond the 0.01 level of confidence. Table III reports these results.

Table III.- Summary of the analysis of variance of the total LCI measures for the four sampling procedures

Source	Sum of Squares	df	Mean Square	F
Between	85774.94	3	28591.66	4.56 [a]
Within	225932.90	36	6275.91	
Total	311707.90	39		

[a]An F of 4.38, 3 and 36 df, is required at the 0.01 level of confidence

The most important implication of this finding is that indications

of communicative competence are truly effected by the stimulus method In other words, it does make a difference which sampling procedure the examiner chooses in attempting to elicit a representative language sample. Recall that Mintun's (1968) study also supported this viewpoint with toys being the preferred sampling procedure with the mentally retarded children in her investigation. Strandberg's (1969) results implied that all three stimulus methods (toys, still pictures of toys, and moving pictures of objects representing the toys) were equivalent as to indications of communicative competence. However, the present investigation presents strong evidence that the stimulus method does indeed effect communicative competence, and that toys may be ranked as a rather poor indicator of communicative competence when compared with verbal directives or child-generated pictures.

The one-way analysis of variance is an over-all test for significant differences within the population. On the basis of the significant F ratio for the between variance, it was necessary to compare all possible permutations to determine the location and magnitude of the group differences. Therefore, six *t* tests were performed. These results are reported in Table IV. Significance levels for all *t* tests throughout this investigation are reported for a two-tailed test. Inspection of Table IV discloses three significant differences, namely, toys vs verbal directives, verbal directives vs radio telemetry, and pictures vs radio telemetry.

Table IV. - Summary of the comparison of the differences in total LCI scores for the four stimulus modes.

Comparison	t value	df
Toys vs Verbal Directives	-1.96[a]	9
Toys vs Child-generated Pictures	-1.75	9
Toys vs Radio Telemetry	1.19	9
Verbal Directives vs Child-generated Pictures	-0.75	9
Verbal Directives vs Radio Telemetry	3.89[b]	9
Child-generated Pictures vs Radio Telemetry	3.08[b]	9

[a]A t of 1.83, 9 df, is required at the 0.05 level of confidence.

[b]A t of 2.82, 9 df, is required at the 0.01 level of confidence.

Inspection of the group means shows the direction of the differences to be as follows: verbal directives yielded significantly higher LCI scores than either toys or radio telemetry. Child-generated pictures also yielded significantly higher scores than radio telemetry. There was no significant difference between those scores obtained from toys and child-generated pictures, toys and radio telemetry, or verbal directives and pictures. Further interpretations of these differences or lack of differences can be found in answer to the second question of this study.

In order to derive a rank-ordering of stimulus methods from this study, it was necessary to consider all available data, including the differences in group means, the standard deviation, and the shape of the distributions. When all of these aspects were considered, the

rank-ordering of these four stimulus methods as to those yielding the highest and most stable indications of communicative competence was concluded to be the following:

1. Verbal Directives
2. Child-generated Pictures
3. Toys
4. Radio Telemetry

The use of a radio telemetry device in a playground situation yielded the lowest LCI scores which were found to be significantly lower than those obtained with verbal directives and with pictures. Although these scores were not found to be significantly lower than those from the use of toys, the fact that the scores were lower and the distribution did not closely approximate the normal curve influenced the decision to make radio telemetry the least preferred sampling procedure. One must also consider such pragmatic factors as the inconvenience, extra time and equipment, and expense involved with this methodology.

Toys were ranked as third since they yielded the third highest group mean LCI scores. The high standard deviation value for toys also indicated much response variability and, hence, the probability of a large standard error of the measurement score.

The decision to rank child-generated pictures as second even though the obtained LCI scores were higher than those of verbal directives was based on many factors. They may be summarized as follows:

1. Comparison of group mean LCI scores from verbal directives vs pictures did not yield a statistically significant difference.

2. Comparisons of group mean LCI scores from both child-generated pictures and verbal directives with radio telemetry yielded statistically significant differences, with radio telemetry yielding significantly lower scores than the other two sampling procedures.

3. Comparisons of group mean scores from toys vs verbal directives yielded a statistically significant difference favoring the verbal directives, whereas the comparison between toys vs pictures failed to yield significant differences. When converted to a symbologic logic system and letting A = verbal directives, B = child-generated pictures, and C = toys, these findings become:

$$A = B$$
$$B = C$$
$$A > C$$

This apparent contradiction is explainable when one considers the fact that verbal directives yielded statistically significant higher scores than toys. This can be explained by an examination of the standard deviation values (c.f. Table II). The *t* test is extremely sensitive to the variance within the measured population. The standard deviation value for toys was the highest (0.96) of the four sampling procedures, indicating much response variability; the standard deviation value for the verbal directives was the lowest (0.51) of the four indicating the least amount of response variability of any of the four procedures. This would then explain the finding of a significant difference between these two. The standard deviation value for child-generated pictures was nearly as high as that for toys, accounting for the lack of significant differences in the two sets of scores.

4. The higher standard deviation value for child-generated pictures than for verbal directives

also indicates a greater amount of response variability with the use of the pictures.

5. The LCI scores from the verbal directives were shown to have a distribution which more closely approximates the normal curve than any of the other three sampling procedures.

The high LCI scores for verbal directives which were statistically equivalent to those from pictures, the small amount of response variability, and the close approximation to the normal curve make the verbal directives the choice for the highest ranked stimulus method of these four. It must be taken into account also that the verbal directives have the advantage of convenience and simplicity. They are designed so as to simplify interstudy comparison and to make the examiner's sampling task as easy as possible.

Differences within the Noun and Verb Phrase Indices

In order to determine if the statistically significant over-all differences obtained were manifested in noun phrase one (the grammatical subject of a kernel sentence), verb phrase one (grammatical action in a kernel sentence), or noun phrase two (grammatical object of the action in a kernel sentence), six *t* tests were performed for each of the three different indices, comparing all possible pairs. Tables V, VI, and VII report these results. A concurrent discussion of these tables follows their presentation.

Table V.- Summary of the comparisons of the differences for NP_1 index scores from the four stimulus modes.

Comparison	t value	df
Toys vs Verbal Directives	-0.41	9
Toys vs Child-generated Pictures	3.18[b]	9
Toys vs Radio Telemetry	5.66[b]	9
Verbal Directives vs Child-generated Pictures	2.51[a]	9
Verbal Directives vs Radio Telemetry	4.02[b]	9
Child-generated Pictures vs Radio Telemetry	2.24[a]	9

[a]A t of 1.83, 9 df, is required at the 0.05 level of confidence.

[b]A t of 2.82, 9df, is required at the 0.01 level of confidence.

Table VI.- Summary of the comparisons of the differences for VP_1 index scores from the four stimulus modes.

Comparison	t value	df
Toys vs Verbal Directives	-3.52[b]	9
Toys vs Child-generated Pictures	-2.64[a]	9
Toys vs Radio Telemetry	-4.52[b]	9
Verbal Directives vs Child-generated Pictures	0.21	9
Verbal Directives vs Radio Telemetry	-0.46	9
Child-generated Pictures vs Radio Telemetry	-0.54	9

[a]A t of 1.83, 9 df, is required at the 0.05 level of confidence.

[b]A t of 2.82, 9 df, is required at the 0.01 level of confidence.

Table VII. - Summary of the comparisons of the difference for NP_2 index scores for the four stimulus modes

Comparison	t value	df
Toys vs Verbal Directives	-0.90	9
Toys vs Child-generated Pictures	-1.82	9
Toys vs Radio Telemetry	0.80	9
Verbal Directives vs Child-generated Pictures	-1.39	9
Verbal Directives vs Radio Telemetry	1.46	9
Child-generated Pictures vs Radio Telemetry	2.24[a]	9

[a]A t of 1.83, 9 df, is required at the 0.05 level of confidence.

Recall that Table IV revealed three of six possible statistically significant t values; Tables V - VII summarized the specific grammatical forms contributing to these over-all differences in those three cases and the lack of differences in the remaining three instances. Inter-comparisons of Tables V - VII reveal that the various sampling procedures differentially affect the LCI grammatical indices. Inter-comparisons for sampling procedures in which no over-all significant differences were found are graphically represented in Table VIII.

Table VIII. - Summary of differences with LCI subtest indices as a function of sampling procedures revealing no over-all mean LCI differences. (ND = No Difference)

Comparison	NP_1	VP_1	NP2
Toys (T) vs Rictures (P)	T > P	P > T	ND
Toys vs Radio Telemetry	T > RT	RT > T	ND
Verbal Directives (VD) vs Pictures	VD > P	ND	ND

For the comparisons between pictures and toys, and radio telemetry and toys, the scores for NP_1 and VP_1 probably cancelled each other out, leaving no statistically significant defferences in the total group means. In the comparison for verbal directives vs child-generated pictures, although no statistically significant difference was computed for NP_2, it is hypothesized that the NP_2 index mean for pictures (3.20) was high enough to cause there to be no statistically significant differences by essentially cancelling the differences obtained in NP_1 but not quite high enough to reach statistical significance over the NP_2 value for verbal directives (2.82).

A similar representation for those comparisons reporting statistically significant differences based on total LCI scores is presented as follows:

1. Toys vs Verbal Directives

NP_1I = No Difference
VP_1I = Verbal Directives > Toys
NP_2I = No Difference

The factor contributing to the higher scores obtained with verbal directives over toys was the verb phrase usage. When children talked about the toys, verbs were noted to be usually simple present or past tense. However, when responding to the verbal directives, they tended to use more sophisticated structures more often, such as the auxiliary and the present participle. Verbal directives probably allow for more of a choicein the use of the verb phrase. The speaker is

not restricted by having to describe the features or the intended function of a specific object.

2. Verbal Directives vs Radio Telemetry

NP_1I = Verbal Directives > Radio Telemetry
VP_1I = No Difference
NP_2I = No Difference

The more complex us of NP_1, or the grammatical subject of the sentence, accounts for the significant differences found between verbal directives and radio telemetry. This is understandable since children out on the playground very often delete the subject ("I" or "You" is the understood subject) or they frequently employ only the simplest noun phrase structures such as single nouns ("you") or noun plus plural ("everybody"). In response to the verbal directives though, the children tended to use more complex and sophisticated structures to introduce the subject of the sentence. Noun phrase one was rarely omitted in response to verbal directives. This also supports some of the old data that said that children use more intricate language when talking to adults than they do when talking with their peers.

3. Child-generated Pictures vs Radio Telemetry

NP_1 = No Difference
VP_1 = No Difference
NP_2 = Child-generated Pictures > Radio Telemetry

The significant differences in the pictures vs radio telemetry comparison are due to the use of NP_2 or the grammatical object of the action in a kemel sentence. The lack of differences in NP_1 can be

accounted for by the fact that the children frequently began their narration of the pictures with "I took" or "This is," thus restricting NP_1 to a single noun. However, since English is a right-branching language allowing much elaboration in NP_2, these children utilized this option and responded with long and complex structures in describing what was shown in the pictures.

Further interpretation of this data reveals that the sophisticated use of NP_1 and VP_1 in response to the verbal directives supports the decision to rank this method over child-generated pictures. In terms of NP_1 usage, no other sampling procedure yielded higher scores than did verbal directives, although one method (toys) obtained comparable scores. In terms of VP_1 usage, scores from verbal directives were significantly higher than those from toys and equivalent to pictures and radio telemetry. In terms of NP_2, verbal directives were statistically equivalent to all three other sampling procedures. In summary, all group mean index scores obtained in response to the verbal directives were found to be either statistically higher than or equivalent to those from the other three sampling procedures. Hence, verbal directives appear to be the least restrictive method as to syntactic alternatives employed by the children in this study.

Frequency of Occurrence of Grammatical Structures

Since verbal directives were ranked as the highest and most stable indicator of communicative competence, a description of linguistic structures generated was desired. A very comprehensive

linguistic description and frequency of occurrence chart for responses from 300 children to these same verbal directives can be found in the study by Miner (1970) on normative data for the LCI. Since the number of subjects for the Miner investigation was so much larger, and since the children in both investigations were drawn from similar populations, it was felt that the description from the study by Miner would be more reliable than that of the present investigation. Therefore, the reader is referred to his study for a thorough description of the structures generated by five-year-olds in response to these verbal directives.

It was decided that a structural description of those responses obtained with toys and radio telemetry was not necessary since these have been shown to be poor indicators of communicative competence with these subjects.

It was desirable to plot the frequency of occurrence of obtained grammatical structures for the child-generated pictures. This was performed because the LCI scores from pictures were found to be statistically equivalent with those from verbal directives, and, therefore, there was interest in comparisons between structures generated in response to both sampling procedures. Furthermore, there has recently been an awakening interest in research in the area of Visual Literacy. Much of the research has centered on the relationship of visual literacy and verbal behavior. There has been, however, no

information generated by the research describing the kind of linguistic structures children use in describing pictures they have taken themselves. This is meaningful information that should be made available to others interested in this area.

Below are comparisons of Miner's data for the ten most frequently occurring grammatical structures in response to verbal directives and data from the present study presenting the ten most frequently occurring structures in response to the child-generated pictures. Comparisons are made for NP_1, VP_1, and NP_2.

Table IX. - Comparison of the 10 most frequently occurring NP_1 structures for verbal directives and child-generated pictures [a]

Verbal Directives			
Structure	% Frequency	Structure	% Frequency
1. N (I..)	71.2%	1. N	75.0%
2. N + P (We..)	11.2%	2. M + N	15.1%
3. N + Poss + N (My Mom..)	6.0%	3. N + P	2.1%
4. M + N (Then there..)	3.0%	4. N + Poss + N	2.1%
5. A + N (A giraffe..)	1.6%	5. M + A + N (When the TV..)	1.0%
6. N + Poss + M + N (My best friend..)	1.1%	6. A + N	1.0%
7. A + M + N (A little boy..)	0.7%	7. A + N + P	0.5%
8. M + N + P (When they..)	0.6%	8. N + Prp + N + P	0.5%

Table IX - Continued

Structure	% Frequency	Structure	% Frequency
9. M + M + N (Once when I ..)	0.5%	9. M + M + N	0.5%
10. M + N + N (Every day I..)	0.4%	10. M + N + P	0.5%

[a]Linguistic symbols employed are: N = Noun, P = Plural, M = Modifier, A = Article, Poss = possessive, Prp = Preposition.

The children in this investigation generated a total of 14 different noun phrase one structures. The ten most frequently occurring structures accounted for 98.3% of all NP_1 structures observed. The four remaining structures accounted for less than two percent of the total NP_1 structures.

Table X.- Comparisons of the 10 most frequently occurring VP_1 structures for verbal directives and child-generated pictures.[a]

Verbal Directives		Pictures	
Structure	% Frequency	Structure	% Frequency
1. V (..have..)	57.7%	1. V	50.0%
2. Aux + V (..do have..)	14.2%	2. V + Pst	24.7%
3. V + Pst (..got..)	10.8%	3. Aux + V	5.3%
4. V + V (..like to watch..)	7.2%	4. Aux + PrPt	4.8%
5. Aux + V +V (..can try to see..)	2.2%	5. V + V	1.9%
6. M + V (..just do..)	1.6%	6. V + Pst + V (..wanted to take..)	1.4%

Table X - Continued

Verbal Directives		Pictures	
Structure	% Frequency	Structure	% Frequency
7. Aux + V + Pst (..was called..)	1.2%	7. M + V	1.4%
8. Aux + PrPt (..is going..)	0.9%	8. V + Pst + PrPt (..was looking..)	1.4%
9. M + V + V (..just love to go..)	0.6%	9. PrPt	0.9%
10. Aux + PreV + V (..am gonna talk..)	0.6%	10. Aux + Pst + PreV + V (..was gonna go..)	0.9%

[a]Linguistic symbols employed are: V = Verb, Aux = Auxiliary, M = Modifier, PreV = Preverb, Pst = Past tense, PrPt = Present Participle.

A total of 24 different verb phrase one structures were generated in response to the child-generated pictures. The 10 most frequently occurring structures accounted for 92.7% of the total VP_1 structures generated.

Table XI.- Comparisons of the 10 most frequently occurring NP_2 structures for verbal directives and child-generated pictures.

Verbal Directives		Pictures	
Structure	% Frequency	Structure	% Frequency
1. N (..you)	21.4%	1. N	17.3%
2. A + N (..a sweeper)	11.0%	2. A + N	10.9%
3. M (..outside)	8.7%	3. M	9.5%
4. N + P (..cartoons)	7.0%	4. N + Poss + N	3.6%

Table XI. - Continued

Verbal Directives		Pictures	
Structure	% Frequency	Structure	% Frequency
5. A + M + N (..a big kid)	5.0%	5. N + M	3.2%
6. Prp + N (..about her)	4.2%	6. A + N + Prp + N (..a picture of her)	3.2%
7. M + N (.. some house)	3.5%	7. M + N	2.7%
8. Prp + A + N (..at the store)	3.4%	8. A + M + N	2.7%
9. N + Poss + N (..my Dad)	2.0%	9. N + Prp + N + Poss + N (..him with my mom)	2.7%
10. N + M (..it now)	1.5%	10. Prp + A + N	1.8%

A total of 220 noun phrase two structures were generated by the children in response to the pictures. The ten most frequently occurring structures accounted for 57.6% of all NP_2 structures generated. The remaining 210 structures accounted for approximately 42% of the NP_2 structures from the child-generated pictures.

An examination of tables IX, X, and XI discloses an impressive similarity. At least seven of the ten structures in all three tables are the same, although the rank-ordering may be slightly different. This similarity, especially because of the small number of samples for the child-generated pictures, presents strong evidence that these structures are those that are most often used by "normal" children in their routine linguistic efforts. These seem to be those structures that

five-year-olds should be generating to be considered on a comparable level with their peers. This information is of vital interest and usefulness to the language clinician in deciding what structures will be most important for the five-year-old to learn to generate appropriately.

Discussion

The major finding of this study was that the sampling procedure utilizing verbal directives yielded the highest and most stable indication of communicative competence. Among these subjects utilized in the study, verbal directives constituted the most desirable stimulus method for statistical (high mean scores, small variability, and distribution shape) and clinical (inter-examiner use, convenience, cost) reasons. The extent to which the present data are generalizable to clinical populations and "normal" five-year-olds in other locations remains an unanswered question, since it has not been experimentally assessed. Nevertheless, in the absence of data to the contrary, the present study would suggest that clinicians give strong consideration to the use of verbal directives as a sampling procedure, especially since the available norms for the LCI are bound to this clinical method.

One criticism that could be leveled at the present investigation and at most of the research reviewed in Chapter II is a failure to measure baseline behavior. A prominent gap in past language research is the lack of insight into the variability of language behavior. At this point it is possible to hypothesize from some of the temporal

reliability data, such as that of Barlow and Miner (1969) that language behavior is essentially steady-state; that is, it does not vary significantly from day to day. However, there is no specific research into this problem to which one may refer. Sidman (1960) points out the necessity of baseline measures in most behavioral research. Without information about the variability of language behavior, there can be no certainty that scores obtained by a child one day would not be significantly better or worse on other days. There is an urgent need for research to graphically represent language behavior of children to determine if language is, in effect, a steady-state behavior.

It is urged that further research and revision be done on the LCI. Scoring procedures are not complete enough to enable the examiner to score complex base structures easily. Research is needed to simplify scoring of negatives, especially. It is this examiner's opinion that the interviewer utilizing the verbal directives should be allowed to use "Tell me more about that one" or something similar when trying to elicit further verbalization about such questions as "Tell me about your favorite toys" (story, game, etc.). It was noted that when the prompt "Tell me more" was utilized after this kind of question, the child usually responded by naming more toys. It seems that a prompt indicating that elaboration on particular items instead of merely a listing is desired would elicit more representative responses from some children.

Regardless of the indicated limitations, the present investigation is felt to be a significant contribution to a broadening of knowledge about the effect of the stimulus method on verbal output. This study shows how one group of children responded linguistically to four different language sampling procedures. It points out the need for continuing research possibly to support this finding, and it serves to re-emphasize the fact that the stimulus method does differentially effect verbal output when sampling child language.

Chapter V

Summary and Conclusions

This investigation was conducted to determine whether differences existed among four different language sampling procedures in measures of communicative competence. Communicative competence for use of language was defined as consisting of two primary attributes: (1) linguistic competence, governing sentence construction ability, and (2) situational competence, selecting sentences in relation to the speaking situation. The situational competence factor has often been overlooked in sampling language behavior in children. That is to say, there has been negligible interest in the possible effect of the stimulus method, the examiner, and the testing environment on verbal output.

New methods for sampling language have been recently developed. Such new methodologies as verbal directives, child-generated pictures, and radio telemetry have not been compared with more traditional stimuli, such as toys, to determine whether any of these procedures yield more representative indications of communicative competence than others. This study was concerned with direct comparisons of the effects of these four language sampling procedures on the verbal output of five-year-old children. Specifically, the questions posed at the outset

of the investigation were:

1. Do statistically significant differences exist among obtained LCI scores for the following procedures for evoking child language samples:

    1. Toys
    2. Verbal Directives
    3. Child-generated Pictures
    4. Radio Telemetry

2. If differences exist, are they manifested in:

    1. Noun Phrase I
    2. Verb Phrase I
    3. Noun Phrase II

3. What is the frequency of occurrence of the obtained grammatical structures for the sampling procedure yielding the highest LCI scores?

A review of related literature reported many studies that had been performed utilizing various language sampling procedures. The general lack of concern with the effect of the stimulus method on verbal output was apparent. It was found that, for the most part, the only criteria for choosing a stimulus method were those of tradition and convenience.

The experimental procedure utilized ten children randomly selected from the five-year-old kindergarten at the laboratory school on the Eastern Illinois University campus. All subjects were between the ages of four years, nine months and five years, three months, had good hearing, and demonstrated the use of the final /s/ and /z/ in their speech. Four language samples were elicited from each child using

the four different sampling procedures. The presentation sequence for each child was randomized utilizing a table of random numbers. The verbal directives consisted of 15 questions to the child about himself and his environment. For the sampling procedure using toys, the child was randomly presented with nine toys about which he was asked to tell the examiner. For the child-generated pictures method, each child was trained by the examiner to use a camera and flashcubes. Each was given a camera and a roll of black and white film to take home and take pictures of anything he wished. After the prints were developed, each subject was allowed to see his prints and explain them to the examiner. For the radio telemetry procedure, it was necessary for each subject to wear a harness and a dummy microphone for two days while at school for familiarization, and then to wear the actual microphone the third day. A 30 minute language sample was recorded from each child while he was out on the playground with his peers.

All samples were elicited, transcribed, and scored by the examiner. The LCI was the measure used for linguistic analysis.

Statistical computations were performed on these data to answer the previously listed questions. The obtained LCI scores from each sampling procedure were described in terms of central tendency, variation, and shape of the distribution curve. Significant differences were assessed by means of a one-way analysis of variance and six *t* tests comparing all possible pairs to determine the locations and

magnitudes of the differences. The t tests were also employed to determine whether differences among procedures were manifested in NP_1, VP_1, or NP_2. A rank-ordering of stimuli was determined according to the highest degree and greatest stability of measures of communicative competence. The frequency of occurrence of obtained grammatical structures was reported for the sampling procedures which yielded the highest mean LCI scores. Interpretations of these data were discussed.

Conclusions

The results of this investigation appear to warrant the following conclusions for the children participating as subjects:

1. The stimulus method does differentially effect verbal output and, hence, judgments of communicative competence.

2. Verbal directives yielded group mean scores which were found to be statistically equivalent to those from child-generated pictures and significantly higher than those from toys and radio telemetry. Verbal directives yielded the lowest standard deviation value of the four procedures, indicating the least amount of response variability. Furthermore, the distribution curve from verbal directives was found to approximate the normal curve more closely than any of the other three procedures.

3. The high scores from verbal directives, the small response variability, and the normal distribution shape made verbal directives the choice for the highest ranked stimulus method. Child-generated

pictures were ranked second, toys third, and radio telemetry fourth.

4. Further supporting evidence for the choice of verbal directives was revealed by statistical analysis of the subtest indices. The mean index scores from verbal directives were found to be either significantly higher than or statistically equivalent to all those from the three other methods.

5. The frequency of occurrence of subtest structures was charted for the child-generated pictures, since the normative data study for the LCI (Miner, 1970) contains a comprehensive frequency of occurrence analysis for verbal directives on a population of 300 five-year-olds. A comparison of that data for the verbal directives and the data from the present study for child-generated pictures revealed an impressive similarity in the ten most frequently occurring grammatical structures from NP_1, VP_1, and NP_2. This indicates that these structures presented in the comparison are probably those which five-year-olds most frequently generate in their routine linguistic efforts, and that a five-year-old functioning at an adequate level of language development should be able to use those structures appropriately.

Implications for Future Research

The following research needs have been suggested during the course of this investigation:

1. Replication of this study on comparable populations of five-year-olds in other geographical locations to assess the generalizability

of the data.

2. Further research and revision on the LCI scoring procedures. The present published information is not comprehensive enough to allow the examiner to score easily a complex sentence. This revision is especially needed for the scoring of negatives.

3. Research designed to represent graphically the variability of the language behavior of children. At this time, there is only slight evidence to support the theory that language behavior is steady-state behavior. The lack of research to support this assumption casts doubt upon all research requiring a language sample. Until investigations are undertaken to answer these questions about variability, the impact of much of the linguistic research is weakened. Therefore, this type of research is urgently needed.

Appendix I

Testing schedule representing randomized presentation sequence of four language sampling procedures (Toys (T), Verbal Directives (VD), Child-generated Pictures (P), and Radio Telemetry (RT)) with 10 Subjects.

Subject # 1

T - September 20th
VD - September 21st
RT - September 29th
P - October 1st

Subject # 2

RT - September 22nd
VD - September 23rd
P - September 24th
T - September 27th

Subject # 3

T - September 20th
VD - September 21st
P - September 24th
RT - September 28th

Subject # 4

P - September 24th
VD - September 28th
T - September 29th
RT - October 1

Subject # 5

T - September 20th
RT - September 23rd
P - September 24th
VD - September 27th

Subject # 6

VD - September 20th
RT - September 24th
T - September 27th
P - October 1st

Subject # 7

T - September 20
RT - September 22
VD - September 23rd
P - September 24th

Subject # 8

P - September 28th
VD - September 29th
T - September 30th
RT - October 6th

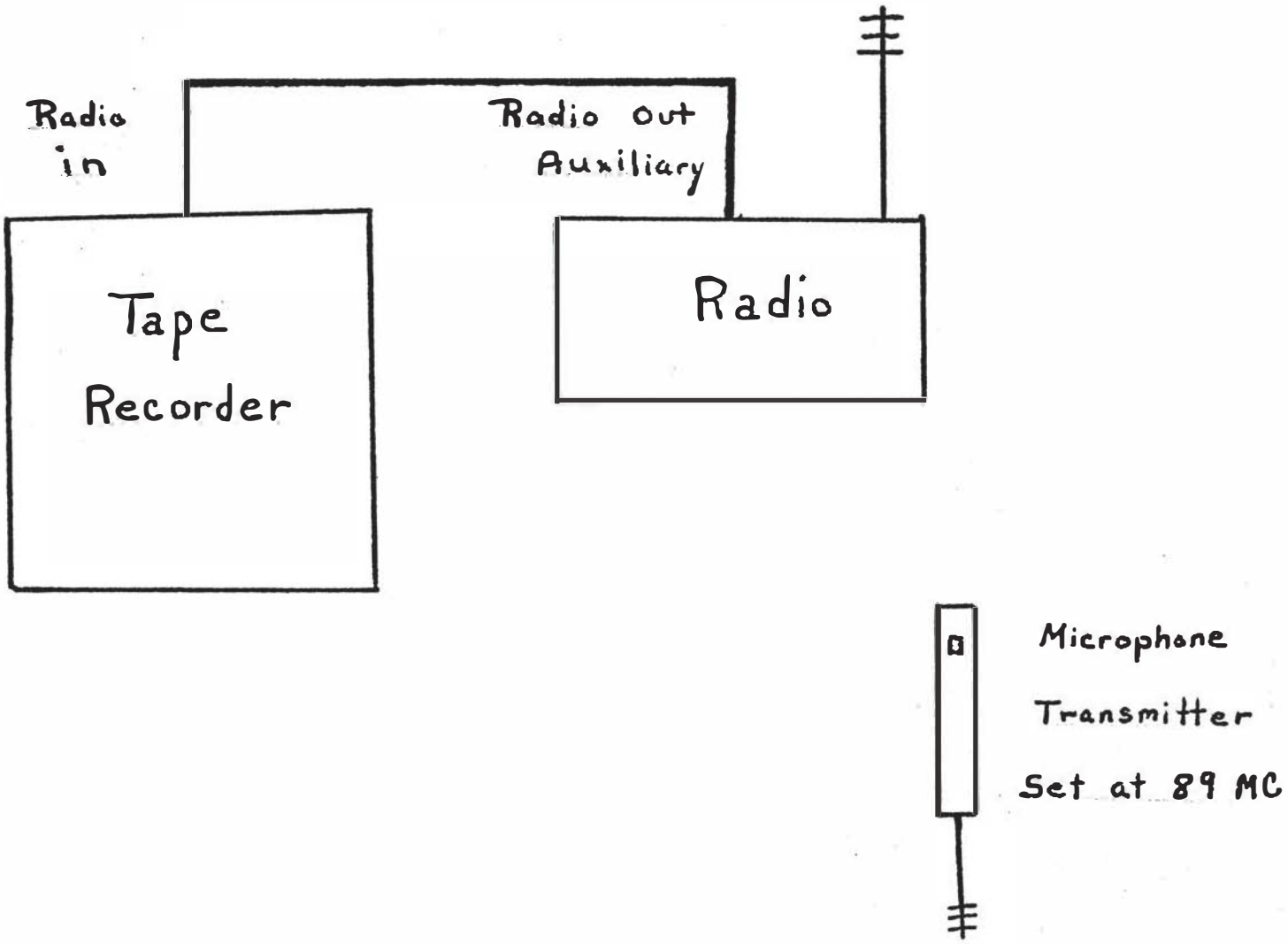
Subject # 9

P - September 24th
VD - September 27th
RT - September 28th
T - September 29th

Subject # 10

P - September 24th
RT - September 27th
T - September 28th
VD - September 29th

Schematic Diagram of Radio Telemetry Instrumentation



Selected Bibliography

Alcorn, Stephen R. "Comparison of Articulation Ratings of /s/ and /r/ by lower-, Middle-, and Upper Socioeconomic Groups," Unpublished Master's Thesis, Department of Speech Pathology and Audiology, Eastern Illinois University, 1971.

Barlow, Margaret C., and Miner, L.E. "Temporal Reliability of the LCI." Journal of Communication Disorders, II, 1969.

Berry, Mildred F. Language Disorders of Children. Appleton-Century-Crofts, New York, 1969, pgs. 374-387.

Blacky Pictures, The. Psychological Corporation, 304 E. 45th St., New York, 1952.

Cazden, Courtney B. "Environmental Assistance to the Child's Acquisition of Grammar." Unpublished Doctoral Dissertation, Harvard University, 1965.

_____. "The Psychology of Language." in Travis, Lee (Ed.), Handbook of Speech, Hearing, and Language Disorders (Rev. ed.), New York: Appleton-Century-Crofts, 1971, pg. 19.

Children's Apperception Test. Psychological Corporation, 304 E 45th St., New York, 1950.

Chomsky, Naom. Syntactic Structures. Gravenhage, The Netherlands, Mouton and Co., 1957.

Cowan, Phillip A.; Weber, J.; Hoddinott, B.A.; and Klein, J. "Mean Length of Spoken Response as a Function of Stimulus, Experimenter, and Subject." Child Development, March, 1967.

Davis, E.A. "The Development of Linguistic Skill in twins, singletons, with siblings, and only children from age five to ten years." Institute of Child Welfare Monograph Series #14. Minneapolis: University of Minnesota Press, 1937.

Day, E.J. "The Development of Language in twins: I. A comparison of twins and single children." Child Development, 3, 1932.

Fransecky, Roger B. "The Use of Visual Communication to Enrich and Extend Traditional Verbal Language Learning." Proceedings of the First National Conference on Visual Literacy, New York: Pitman Publishing Corporation, 1970.

Griffin, John I. Statistics: Methods and Applications. New York: Holt, Rinehart, and Winston, 1962, pgs. 113-115.

Griffith, Jerry. "Comment on 'A Standardized Method for Obtaining a Spoken Language Sample.'" Journal of Speech and Hearing Research. 13, No. 2, June, 1970, pgs. 438-439.

_____, and Miner, L.E. "LCI Reliability and Size of Language Sample." Journal of Communication Disorders, II, 1969.

Hahn, Elise. "Analysis of the Content and Form of the Speech of First Grade Children." Quarterly Journal of Speech, 34, 1948.

Hon, Martha. "Construct Validity of the LCI." Unpublished Master's Thesis, Department of Speech Pathology and Audiology, Eastern Illinois University, 1970.

Hoshiko, M. and Holloway, G. "Radio Telemetry for the Monitoring of Verbal Behavior." Journal of Speech and Hearing Disorders, XXXIII, 1968.

Hymes, Dell. "On Communicative Competence" (Paper presented at Research Planning Conference on Language Development in Disadvantaged Children, Yeshiva University, New York, June 7, 1966), pgs. 1-16.

James, Slyvia E. "Transformational Skills of Culturally Disadvantaged and Culturally Advantaged Children." Unpublished Master's Thesis, Department of Speech Pathology and Audiology, Eastern Illinois University, 1968.

Janus, Sidney O. "An Investigation of the Relationship between Children's Language and their Play" Journal Genetic Psychology, 62, 1943.

Labov, William. "The Logic of Nonstandard English." Monograph Series on Language and Linguistics: 20th Annual Roundtable, Washington: Georgetown University Press, 1969.

McCarthy, Dorthea, "A Comparison of Children's Language in Different Situations and Its relation to Personality Traits." Journal of Genetic Psychology, 36, 1929.

_____. "The Language Development of the Preschool Child," Institute of Child Welfare, Monograph Series No. 4, Minneapolis: University of Minnesota Press, 1930.

_____. "Language Development in Children." in Carmichael, L. Manual of Child Psychology (1st Ed.), New York: Wiley, 1946.

McConnan, K. "The Situation Factor in the Language Responses of Nursery School Children." Unpublished Doctoral Dissertation, University of Minnesota, 1935.

McNeill, D.D. Developmental Psycholinguistics: A Study in Language Acquisition. New York: Prentice-Hall, 1970.

Menyuk, Paula, "Syntactic Structures in the Language of Children." Child Development, XXXIV, June, 1963.

Miner, L.E. "A Normative Study of the LCI for Five-Year-Old Children." Unpublished Doctoral Dissertation, University of Illinois, 1970.

_____. "Effects of Visual Stimuli on Verbal Behavior." in Williams, Clarence M. and Debes, John L. (Eds.). Proceedings of the First National Conference on Visual Literacy. New York: Pitman Publishing Corporation, 1970.

_____. "Scoring Procedures for the LCI: A Preliminary Report." Journal of Communication Disorders, III, 1969.

Minifie, F., F.L. Darley, and D. Sherman. "Temporal Reliability of Seven Language Measures." Journal of Speech and Hearing Research., 6, 1963.

Mintun, Shirley. "An Evaluation of Three Stimulus Media for Eliciting Verbal Language Samples for Educable Mentally Retarded Children." Unpublished Master's Thesis, Department of Speech Pathology and Audiology, Eastern Illinois University, 1968.

Morris, Hughlett L. "Communication Skills of Children with Cleft lips and Palates." Journal of Speech and Hearing Research, V, 1962.

Mykelbust, H. Development and Disorders of Written Language, Vol. 1: Picture Story Language Test. New York: Grune and Stratton, 1965, pg. 71.

O'Donnell, Roy C., William J Griffin, and Raymond C. Morris. "Syntax of Kindergarten and Elementary School Children." National Council of Teachers of English Research Report # 8. Champaign, Illinois, 1967.

Povich, J. and Baratz, J. "An Investigation of Syntax Development of Head Start Children: Developmental Sentence Types Analysis." (paper presented at ASHA convention, Chicago, November, 1967.)

Shriner, T.H. "A Review of MLR as a Measure of Expressive Language Development in Children." Journal of Speech and Hearing Disorders, XXXIV, February, 1969.

Shuy, R.W., W.A. Wolfram, and W.K. Riley. Linguistic Correlates of Social Stratification in Detriot Speech. Cooperative Research Project #6-1347, Michagan State University, 1967.

Sidman, Murray. Tactics of Scientific Research. New York: Basic Books, Inc., 1960, pg. 234-256.

Siegel, Gerald M. "Inter-examiner reliability for Mean Length Response." Journal of Speech and Hearing Research, 5, 1962.

Smith, M.E. "An Investigation of the Development of the Sentence and the Extent of Vocabulary in Young Children." University of Iowa Studies in Child Welfare, 3, No. 5, 1932.

_____. "Some Light on the Problem of Bilingualism as found from the study of the progress in Mastery of English among Pre-school Children of Non-American Ancestry in Hawaii." Genetic Psychology Monograph # 21, 1939.

Strandberg, Twila E. "An Evaluation of Three Stimulus Media for Evoking Verbalization from Preschool Children." Unpublished Master's Thesis, Department of Speech Pathology and Audiology, Eastern Illinois University, 1969.

_____., and Griffith, Jerry. "Study of the Effects of Training in Visual Literacy on Verbal Language Behavior." Journal of Communication Disorders, II, 1969.

Templin, Mildred C. "Certain Language Skills in Children, their development and interrelationships." Institute of Child Welfare Monograph Series # 26. Minneapolis: University of Minnesota Press, 1926.

Williams, Frederick, and Narramore, Rita C. "Social Class Differences in Children's Syntactic Performance: A Quantitative Analysis of Field Study Data." Journal of Speech and Hearing Research, Vol. 12, December, 1969.

Williams, R.M., and Mattson, M.L. "The effect of Social Grouping upon the Language of Preschool Children." Child Development, 13, 1942.

Wilson, Maarg. "A Standardized Method for Obtaining a Spoken Language Sample." Journal of Speech and Hearing Research, XII, March,1969.

Winitz, Harris. "Language Skills of Male and Female Kindergarten Children." Journal of Speech and Hearing Research, II, December, 1969.