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Twila Estelle Yuncker Strandberg
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AN EVALUATION OF THREE STIMULUS MEDIA FOR EVOKING

VERBALIZATIONS FROM PRESCHOOL CHILDREN

(TITLE)

BY

Twila Estelle Yuncker Strandberg

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF

Master of Science in Speech Correction

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS

1969

YEAR

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

March 10, 1969
DATE

March 10, 1969
DATE

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CHAPTER I

STATEMENT OF THE PROBLEM

Introduction

Language is an integral part of the total picture in the growth and development of the child. Expressive language is frequently one factor through which a child's growth and development are studied and assessed, especially in very young children. It is vital to obtain as accurate a representation of the child's language performance as possible.

Both Chomsky (1957) and McNeill (1966) have pointed out the importance of differentiating between linguistic competence and linguistic performance. Chomsky states that "A language user's competence is knowledge of his language; his performance is the actual use he makes of that knowledge in concrete situations. It is to describe the language user's intrinsic competence that a grammar is developed" (McNeill, 1966) According to McNeill, "performance is the expression of competence in talking and listening to speech." This author mentions that an individual is competent to deal with an infinite number of grammatical sentences and yet his performance is affected in various ways. Limitations, such as memory, which is finite, and time, which must be kept up with, do not affect competence. McNeill feels that performance can be described without explaining it. However, if an attempt is made to explain performance, it is necessary to show how it derives from competence (McNeill, 1966).

Miner discusses recent developments in descriptive linguistics that have provided new methodologies for assessing verbal maturity in children:

"One approach has discussed the emergence of two and three word sentences in terms of certain "open" and "pivot" class constructions. (Brown and Bellugi, 1964; Brown and Fraser, 1963; Brown, Fraser, and Bellugi, 1963; Ervin, 1964; Miller and Ervin, 1964; Braine, 1963; McNeill, 1966a, 1966b). It examines the way in which children initially combine words into sentences. A second method proposes a tentative hierarchy of developmental sentence types. It proceeds from various kinds of two word combinations through noun phrase constructions and kernel sentences up to emerging transformations (Lee, 1966). A third classification system purports to measure both the length and complexity of utterances (Shriner, 1967). It consists essentially of numeric weighting scale for assessing developmental changes in child language. Each of these three techniques attempts to describe the grammatical rules that children employ in generating sentences." (Miner, 1969).

Concern with individual differences sets the area of speech and language pathology apart from psycholinguistics. The generative rules which psycholinguists want to identify and describe reside in competence, not performance. For differential diagnosis, the speech pathologist must effectively test the performance and from it make inferences about competence. For this reason any language measurement tool must be judged by utility in a clinical setting.

If judgments regarding deviation from normal, in terms of verbal language behavior are made, it is necessary to use the best combination of measurement tools to relate observations of performance to rules for competence.

In evaluating child language, researchers and clinicians alike generally obtain a language sample using a variety of procedures. One or more language measures are applied to the samples and a level of

language development is determined. This level is compared to normative data if it is available, and when indicated, clinical and educational procedures are designed to improve the language performance.

No standard methods have been devised to evoke the language sample. Various procedures reported in the literature include: (1) observation of free play, (2) role-playing, (3) loosely structured situations where the child is expected to respond verbally to selected objects; for example pictures, toys, etc., (4) more structured situations involving the use of parts of various projective tests, (5) conversation among peers, (6) conversation between the examiner and the subject, and (7) conversation between another adult and the subject.

Methods of measurement of the sample reported in the literature are (1) the mean length of response (Templin, 1957), (2) mean of the five longest response (Templin, 1957), (3) median number of one word response (Templin, 1957), (4) structural complexity score (Templin, 1957), (5) the total number of words and the number of different words used (Mintun, 1968; Strandberg and Griffith, 1968), and the spontaneity index, (Morris, 1962; Strandberg and Griffith, 1968). There is evidence that these measures are closely related to and effected by the stimulus used to evoke the sample.

Most investigators are concerned with only the verbal output from the child and give little consideration to the input. One notable exception is Cowan, Weber, Hoddinott and Klein (1967) who concluded that for precise language measurement it is necessary to "specify the particular examiner, stimulus and child." Since it considers the input item or stimulus as a significant variable, the present study could be regarded as an extension of the Cowan study.

For this study the stimulus refers to the materials and the medium by which the materials are presented for the purpose of evoking verbal language behavior.

Past research indicates that verbal responses of children have been evoked, evaluated and discussed with little or no attention given to the stimulus medium. In certain instances the stimulus used was not even mentioned. In others, the stimulus was mentioned, but with no indication that each subject was presented with the same material in the same order and with the same instructions.

Cowan, et al (1967) demonstrated that childrens' verbal responses are functions of both stimulus and examiner. Their results state that differences in output were achieved by various examiners, however, these are difficult to interpret since the examiners did not use standard instructions. Also, the mean length of response was the only language measure applied. A possible explanation might be that different stimuli affect particular language measures (Mintun, 1968; Strandberg and Griffith, 1968).

The examiner was aware of the many variables present in the situation, clinical or experimental, in which a language sample is obtained that can affect the sample. Consequently, in this study, she attempted to determine to what extent the stimulus is a variable. The procedure and examiner variables were controlled.

The purpose of this investigation was to make a preliminary analysis of the affects of selected stimuli in evoking verbal responses in children.

Two basic questions were posed at the onset of the study:

1. Do different stimulus media used to evoke verbal language samples in children result in measurable differences in the length, grammatical complexity, total number of words and number of different words in the sample when other variables are held constant?
2. How do the language measures from different studies using the same measures but different stimuli to evoke the samples compare?

CHAPTER II

REVIEW OF THE LITERATURE

McCarthy (1930) was one of the earlier investigators to measure the language development in normal speaking pre-school children. As stimuli for evoking verbal responses she used picture books and toys. One book contained animal pictures and another illustrated Mother Goose rhymes. The toys were: a small red auto, a cat that squeaked, a telephone with a bell, a little tin mouse, a music box and a small ball. Templin (1957) describing McCarthy's technique, states, "She obtained fifty verbalizations from 140 subjects between the ages of 18 months and 54 months in a reasonably standardized child-adult situation. Certain toys and books were used to stimulate the verbalization of twenty children within 1.5 months of 18, 24, 30, 36, 42, and 54 months." The data were subjected to four major types of analysis: (1) length of response, (2) complexity of sentence structure, (3) function of the response, and (4) proportions of various parts of speech (McCarthy, 1954).

McCarthy used toys and pictures interchangeably. Johnson, et al. (1963) reported that McCarthy found that with younger children an animal picture book having one central object in each picture was particularly suitable. This contrasts with the findings of Strandberg and Griffith (1968) who found that photographs displaying single objects had a restrictive influence upon a child's language behavior. Mintun (1968) found the same occurred with older mentally retarded children.

Day (1932) used the McCarthy procedure, definitions, classifications and methods of analysis in her study of two to five year old twins.

Davis (1937) used approximately the same procedure as McCarthy but modified the stimuli to include cowboys and Indians to increase male interest. Subjects were 436 children, ages 5.5, 6.5 and 9.5 years. She clarified McCarthy's rules for sentence classification. Davis used ship pictures, a book showing simple school situations and several colored animal books. She preferred toys, and resorted to pictures only when toys failed to stimulate the child.

Johnson, et al. (1963) discussed some of the earlier research in obtaining language samples and describe materials and their use. It was stated that the materials need not be presented in the same way to all children, and that the examiner should be adaptable. The child could express a preference for toys or pictures first. If there was not evident preference, the examiner could select a toy or picture thought to be of highest interest. Davis was quoted as using the following opening remarks, "I wonder what you play with at home", "Here are some animals that not many children know," or "Now I'm going to show you something funny," or "Now we're going to look at some books. I want you to tell me about the pictures." The point was made that it was possible to obtain the specified number of responses with one item for one child, while other subjects must be exposed to the entire assortment.

Templin's study was a comprehensive description of certain language skills in children from three to eight years of age. She utilized a total sample of 480 cases made up of eight subsamples of sixty cases at 3, 3.5, 4, 4.5, 5, 6, 7, and 8 years of age. The samples were analyzed

in terms of mean length of response, number of one word responses, mean of the five longest responses, number of different words, structural complexity of responses and size of recognition vocabulary. Templin followed McCarthy's technique and utilized stimulus materials as nearly identical as possible. Verbal instructions for the subjects are not reported.

Siegel (1962) reporting on the interexaminer reliability of judgments of mean length of response, used Children's Apperception Test cards (1952) as stimulus material. The cards were presented sequentially with the verbal directive "Tell me what is in this picture." The examiner remained neutral and made only remarks necessary to encourage the child to talk. One hundred responses were collected from each of the thirty subjects, who were sub-retardates, aged 11 to 17 years.

Morris (1962) in a study of communication skills of cleft palate children, used toys and pictures as stimulus materials for evoking verbal responses. For assessing language, he obtained measures based on connected speech, vocabulary size and articulation skills. The measures utilized for the connected speech were mean length response, mean of the standard deviation for mean length response, number of one word responses, mean of the five longest responses, structural complexity score and the number of different words.

Minifie, Darley and Sherman (1963), investigating consistency of language performance of young children, utilized three sets of pictures to evoke responses. One set was cards from the Children's Apperception Test (1952) and the other two sets were constructed by the examiner and judged by the experimenters to be of interest to children. The order of presentation of the three sets for three trials was constant. The cards

were presented one at a time and the child was encouraged to "Tell a story about the picture." If there was little response the examiner asked "What is happening in this picture?". Fifty responses were evoked on three occasions in the child's home, from 96 subjects between five and eight years of age. The investigators tested the temporal reliability of seven language measures: mean length of response, mean of five longest responses, number of one-word responses, standard deviation of response length, number of different words, structural complexity score and type-token ratio.

In determining whether Chomsky's (1957) model of grammar was suitable for sampling children's language, Menyuk (1961), used three stimulus situations. The first was spontaneous speech responses to the projective test, The Blacky Pictures (1950). The second was conversation with an adult (the examiner) in which the child responded to questions from the experimenter and from the Blacky Manual; in all cases the same questions were presented to all children. The third was conversation with peers generated in a role playing situation involving three children. Play objects were handed to the children, identified as 'some things to help you pretend.' The children were to pretend they were a family and that they'd just gotten up in the morning and were getting ready for the day. The experimenter did not participate unless a question was directly asked. The play situation was recorded for a period of fifteen minutes. The samples from these three situations were pooled and analyzed statistically. In addition, the children were observed for two hours in a classroom situation and written recordings made for cross-validation. It was found that basic structures could be described within the framework of the Chomsky model.

Cazden (1965), using twelve negro children 28 to 38 months of age, attempted to determine whether a child benefits more from a particular interaction with adults (in this case, expansion) or simply from ample exposure to well-formed speech. Subjects received thirty or forty minutes of exposure per day for a period of three months. The subjects were divided into two groups and used treatment rooms equipped with duplicate materials: a color cone, puzzle, Raggedy Ann Doll, stuffed dog, family of 6" bendable rubber dolls, a telephone, tea set, wash basin with sponges and a towel, pots and a cardboard stove, plasticene, tinker toys, 8 inch and 10 inch mirrors, pocketbook with comb, toy mirror, beads and scarf, and books. During an orientation period the materials were divided into three categories according to their usefulness in evoking conversation from children. The first category discussed was Montessori-type materials, represented by the color cone and a simple geometric puzzle. These were found useful in the first few days to help establish rapport. The child could enter the room, begin work and experience immediate success without interaction with the adult. However, since the children tended to sit for long periods in silence, these materials were used less when rapport was established. Cazden pointed out that Montessori materials are structured in what they are and what can be done with them. The exact opposite was represented by the plasticene and blocks. These had little built-in structure, and the child could use imagination. Verbalization was encouraged, but the examiner experienced difficulty in understanding and responding because the possible topics of conversation were so numerous.

Dolls, cars, house-keeping and dress-up materials were a middle-ground. Cazden mentions that the nature of these materials is fixed but

they may be used in a variety of ways. Talk was plentiful and the topic of conversation was usually obvious.

Books were available and used in different ways. In the group using expanding sessions, they were used as pictures to be talked about; in the modeling sessions one book was read verbatim each day. The books were selected for both pictures and texts. The examiner chose books containing pictures that were simple and uncluttered and portrayed actions rather than static objects. The texts had simple well-formed sentences and did not depend for their comprehension on following a continuous plot. The data were analyzed according to the following language measures: (1) mean length of utterance, (2) noun phrase index, (3) verb complexity index, (4) copula index, (5) sentence-type index and (6) sentence imitation test.

In working with a disturbed non-verbal boy, Salzinger, Feldman, Cowan and Salzinger (1967) used operant conditioning to evoke verbal responses. The stimuli were described as a book, a large and small stuffed dog and a stuffed bear. These were personal favorites of the child. The unit of measurement of amount of vocal or verbal behavior was the number of seconds of vocalization time per one minute of clock time.

Povich and Baratz (1967) presented photographs of the child in his natural environment as stimuli for evoking language samples in evaluating the language of negro pre-school children. Lee's (1966) developmental sentence types and Menyuk's transformational analyses techniques were used for evaluation.

In developing an equation to assess child language, Shriner and Sherman (1967) obtained language samples from several sources. Pictures were used as stimuli to evoke the samples. The following measures were

utilized: mean length response, mean of the five longest response, number of one word responses, standard deviation of response length, number of different words and the structural complexity score.

Cowan, Weber, Hoddinott and Klein (1967) studied variation in mean length of spoken response (MLR) as a function of stimulus, experimenter and subject. The authors state that in MLR research there has been little concern with methodological variables. Their study focused attention on two variables--stimulus and examiner. Stimuli were ten pictures, 5 x 7 inches, mounted on colored paper; all were taken from a popular magazines' paintings. The pictures showed varying numbers of adults and children engaged in different activities. The subject's chronological age, sex, socio-economic status and IQ were controlled. Their results indicated that the stimulus and examiner variables could account for the differences in MLR between studies. The authors stated "the specific nature of the individual differences cannot be described precisely using the McCarthy approach to language measurement without specifying the particular examiner, stimulus and child...the implicit assumption that magnitude of MLR is the property of the subject, independent of the setting, should be discarded."

James (1968) in evaluating transformational skills of culturally advantaged and culturally disadvantaged children, constructed a set of colored stimulus pictures from pre-primers of several basic reading series. The pictures were judged by university speech pathologists to be of interest to pre-school children. The pictures were of familiar environmental scenes. The pictures were presented to the children one at a time in a standardized procedure. The order of the presentation of the pictures was constant. The examiner stimulated verbal responses by saying one of the following:

"Tell a story about the picture", or "What's happening in the picture?"

If the child failed to respond to one of the pictures, "Make a longer story", or "What else is happening in the picture?".

In determining the temporal reliability of the length complexity index and the mean length response, Barlow (1968) constructed three sets of stimulus pictures from reading readiness materials. Two examiners were used to evoke samples. A random order of presentation was used between sets of pictures, but the order of presentation of pictures within a set was constant.

Strandberg and Griffith, mentioned earlier, examined the language behavior of four and five-year-old children when they were talking about pictures they had taken themselves with a still camera. Language samples were obtained from the children when they were describing their pictures made under three conditions: (1) pictures of ten individual toys, (2) pictures taken at home, (3) for an experimental group pictures taken at home following instruction in ways in which pictures go together to tell a story. The measures obtained in condition three were compared to a control group who received no training. Five language measures were applied to the samples obtained: the length-complexity-index, mean length response, total number of words, number of different words and the spontaneity index. Differences within measures for the three conditions were tested statistically for significance and the statistical relationships among the measures were determined. The principle findings were:

1. The subjects' language responses were significantly longer and more grammatically complex when they were talking about pictures they made at home compared to pictures they made of specified individual objects.

2. Training in picture sequencing significantly increased the length and complexity of the subjects' language responses. This effect was greater for the four-year-old subjects than for the five-year-old subjects.
3. The subjects' language behavior was significantly more spontaneous when they described pictures taken at home than when they described the pictures of toys. Training in picture sequencing did not significantly affect spontaneity.
4. The subjects did not differ significantly in the total number of words they uttered in the three conditions nor did they differ in the number of different words uttered. However, the relationship between TNW and NDW did change significantly when samples obtained for pictures of toys and pictures taken at home were compared. This relationship is such that when talking about pictures of toys a subject used the same number of words as when talking about pictures taken at home but the variety of words was not as high or may actually have been reduced. This finding, when considered in relation to the fact that significantly more responses had to be evoked when subjects were talking about the pictures of toys, points up the restrictive influence of this type of stimulus upon a child's language behavior. The training did not seem to affect either of these two measures.
5. Of the language measures used the LCI seemed to be the most sensitive to changes in language behavior brought about by training in visual literacy or the content of the pictures a child has made.

Mintun, mentioned earlier, recently completed a study which duplicated the present investigation comparing the effects of three selected stimulus media on the language measurements from a population of mentally retarded children. Identical stimuli were used and the examiners utilized standardized directions, and the data were evaluated by the same language measures. The results indicated that the film medium yielded significantly higher LCI scores than pictures while both films and toys yielded essentially the same LCI scores. The individual items within each medium were not significantly different from each other on LCI scores. The MLR scores were not significantly different among the three media nor among the items within any of the three media. The toy medium evoked a significantly higher total number of words

and a significantly larger number of different words than films and pictures. Films yielded significantly higher values for the two language measures than pictures. These results suggested that the stimulus media used to evoke language samples from primary educable mentally handicapped children varied in stimulus value depending upon the language measure applied to the sample.

The toys in both the Strandberg and Griffith and the Mintun studies were the identical ones used in the present investigation.

As summarized in Table 1 it is apparent that a wide variety of stimulus materials and language measures have been used. The interdependency among the examiner, stimulus and measures reported and the lack of standardization in methodologies for evoking language samples, point up the need for additional study of these relationships.

TABLE 1.--Summary of investigator(s), stimuli, 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_1 WR); number of different words (NDW); structural complexity score (SCS); mean of the five longest responses (M_5 LR); 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 (VCI)

Investigator	Stimuli	Language Measure
1930 McCarthy	Picture books = animal pictures & 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 and analysis as McCarthy
1937 Davis	Picture books = ship pictures, school situations Toys = similar to McCarthy's added cowboys & Indians	McCarthy procedure, clarified rules for sentence class
1957 Templin	Duplicated McCarthy's as nearly as possible	MLR, N_1 WR, M_5 LR, NDW, SCS
1961 Menyuk	Blacky Pictures, conversation with examiner, peers, classroom situation	Transformational analysis
1962 Siegel	Children's Apperception Test cards	MLR
1962 Morris	Toys and pictures	MLR, MDS, N_1 WR, M_5 LR, SCS, NDW

TABLE 1 - continued

Investigator	Stimuli	Language Measure
1963 Minifie, Darley Sherman	Three sets of pictures: CAT cards, and two con- structed by examiner	MLR, M ₅ LR, N ₁ WR, SD-RL, NDW, SCS, TNW
1965 Cazden	Toys (see text) Books	MLR, NPI, VCI, Copula Index, Sentence-type index, sentence imitation test
1967 Salzinger et al	Toys = personal ones of the subject	Number of seconds of vocalizations time per one minute of clock time
1967 Povich & Baratz	Photographs of child in natural environment	DST, transformational analysis
1967 Shriner & Sherman	Pictures	MLR, M ₅ LR, N ₁ WR, SD-RL, NDW, SCS
1968 James	Set of pictures from pre-primers	Transformational analysis
1968 Barlow	Three sets of pictures from reading readiness materials	MLR, LCI
1968 Mintun	Photographs of toys, toys, moving pictures of toys	MLR, LCI, TNW, NDW
1968 Strandberg & Griffith	Photographs taken by subjects of: specified toys, and environment	MLR, LCI, TNW, NDW Spontaneity index

CHAPTER III

SUBJECTS, PROCEDURES, EQUIPMENT

Selection of Subjects

Thirty normal speaking Caucasian children living in the East Central portion of Illinois were selected for participation in this investigation. The children were selected on the basis of age, sex, intelligence, hearing, physical status, articulatory proficiency in final /s/ and /z/ sounds and language background. The subjects were randomly assigned to three groups of ten children each with each group representing a different type of stimulus. These children were currently enrolled in kindergarten.

A. Age

The age of the selected subjects was four and five years. The subjects ranged in age from four years zero months to five years eleven months with a mean age of 5.1 years.

B. Sex

Fifteen of the children were males and fifteen of the children were females.

C. Intelligence

Subjects were selected on the basis of normal intelligence as determined by the Ammons Ammons Quick Test of Intelligence (Ammons and Ammons, 1965). They ranged in mental age from five years two months to eight years five months with a mean of six years two months and a s.d. of 9.6 months. The samples as a whole would be described as above average in intelligence as measured by a verbal-perceptual instrument.

D. Hearing

A pure tone audiometric sweep check of 500, 1000, 2000 and 4000 Hz at 30 dB (I.S.O., 1964) in both ears was administered to each of the subjects. Failure to respond at any frequency excluded the child from the study.

E. Physical Status

The subjects selected exhibited no observable gross neuromuscular impairments.

F. Language Background

Twins and children from bilingual homes were excluded from participation. No child displaying excessive disfluencies, in the opinion of the examiner, was selected.

G. Articulation

Subjects were eliminated if neither the final /s/ and /z/ sounds nor a recognizable substitute had developed. This was determined by asking the subjects to repeat the following: cake, cakes; cat, cats; dog, dogs; mess, messes. This was considered necessary since one of the linguistic measures involved scoring for plurals.

H. Socio-economic Status

The occupation of the principle wage earner in the family of each subject was determined. The following occupational categories are represented. The number of subjects falling in each category is shown in paranthesis.

Student Personnel Consultant	(1)
Industrial Workers	(5)
Funeral director	(1)
Student	(1)

Physician	(2)
Teacher	(2)
Physical therapist	(1)
Construction worker	(1)
X-Ray technician	(1)
Laundermat owner	(1)
Aid Dependent Children	(1)
Minister	(1)
Owner-shoe store	(1)
Heavy equipment operator	(1)
Dentist	(1)
Owner-auto body shop	(1)
Plumber	(1)
University professor	(1)
University instructor	(5)
University academic advisor	(1)

Procedure

A. Examiner

Cowan, Weber, Hoddinott and Klein (1967) have demonstrated that the examiner is a variable. Therefore the same examiner evoked, transcribed and analyzed the language corpus. She has had approximately six hundred hours experience in evoking language samples and applying the language measures utilized in this study.

The examiner considered the following in determining what should be classified as an utterance: a response was considered finished if a child

came to a full stop, either letting the voice fall, giving interrogatory or exclamatory inflection or indicating clearly that he did not intend to complete the sentence. When one simple sentence or fragment of a sentence was followed immediately by other simple sentences or units, with no pause for breath the two were considered to comprise one verbal response. Some subjects connected several short fragments together and at times a 'catch' breath would be obtained in the middle of a fragment. This was counted in the same utterance if the fragment was clearly a continuation of what was being said.

B. Stimuli

The examiner selected three modes of stimulation for evoking the verbal responses: toys, pictures and single concept films. An attempt was made to select items of universal appeal to four and five-year-old children. "Fad" or momentarily popular items were avoided.

1. Toys

No toy was selected that presented a unique tactile sensation, e.g., furry, fuzzy, or skin-like. The toys were colorful, durable, inexpensive and easy to clean.

The following toys were selected:

- | | | |
|-------------|------------------|--------------|
| 1. iron | | |
| 2. doll | (practice items) | |
| 3. gun | | |
| 1. horse | 4. fire engine | 7. telephone |
| 2. dog | 5. cash register | 8. car |
| 3. airplane | 6. tractor | 9. piano |

A list of the manufacturers and model numbers of the toys is presented as Appendix A.

2. Still Photographs

To reproduce as nearly as possible the exact toy in picture form, 8 x 10 inch colored photographs were made of the toys against a neutral background. The photography was done by a professional photographer on the staff at Eastern Illinois University. Photographic experts at Eastman Kodak Company advised the examiner in terms of appropriate picture size, processing, type of finish, and mounting. The photographs, with matte finish were molded to 1/8 inch cardboard with no edge extending beyond the photograph. The sturdiness made the photographs easy and practical for the subjects to handle. Kodak Film (Kodacolor-X, CS-135) was used in a Nikon 35 mm camera.

3. Single-Concept Films

A twenty-second colored single concept moving picture film was made of each item. Extraneous factors were kept to a minimum. The films were originally shot at 16 mm and then reduced to 8 mm and loaded into cartridges. The films were taken with a Bolex H-16 movie camera. The films were shown on a Kodak Ektagraphic Projector which was self-threading and self-winding.

D. Method

The subjects were divided into three groups of ten subjects each. There were five males and five females in each group. Two groups consisted of equal number of four and five-year-olds. One group had six five-year-olds and four four-year-olds. There were no additional four-year-olds available who could meet all the criteria for subject selection. Group I was presented with the toys, Group II with the photographs of the toys and Group III with the single concept films of the items represented by the toys.

The children were interviewed individually, seated at a table, in a separate room in the building in which the kindergarten was held. Rapport had been established in the testing session which had taken place approximately one week earlier.

The children were oriented to the task by the use of three practice items (iron, doll, gun). To begin the orientation, the examiner said, "I am going to show you some toys (pictures, films). I want you to tell me as much as you can about each one." Depending on the group it was either a toy iron, doll and gun; a photograph of the same iron, doll and gun; or a single concept film of an iron, a doll and a gun. To help the child learn the task, additional verbal directives were given with the practice items. The subjects were asked "What is it?" "What is it made of?" "What color is it?" "What do you do with it?" and "Tell me a story about it." This was to call the child's attention to the relevant features of the stimulus. The subjects were encouraged by "yes" or "that's right" especially for longer responses. They were prevented, when possible, from merely labeling the item. The verbal responses evoked during the practice session were not included in the language corpus. The order and method of presentation of the stimuli remained constant for all subjects. The toys and photographs were placed on the table before the child. He was permitted to handle them if he desired and no limit was placed on the discussion time. The single concept films were shown as many times as requested, but at least twice to each subject.

Following the practice session, the subject was presented with nine separate stimuli using the same procedure, with the following verbal directives, "Tell me all you can about this", "Tell me more about this." Verbal reinforcement was kept to a minimum, and used only if needed for

encouragement. At times it was necessary to repeat the subject's remarks for clarification. This procedure, the verbal directives and the order of presentation of the items remained constant for all subjects.

All responses were recorded on a Wollensak tape recorder (Model T-1500) and transcribed as soon as possible so recall of events could assist in accurate transcriptions. As mentioned earlier, the child was allowed to verbalize as long as he desired. Verbal responses regarding extraneous features in the testing situation were eliminated. Only responses directly related to the stimulus items were included in the language corpus.

E. Language Measures

Four language measures were used. They were the length-complexity-index (LCI), mean-length-response (MLR), total number of words (TNW) and number of different words (NDW).

1. Length-complexity index = The length-complexity-index (LCI) is a linguistic measure designed to make a composite analysis of sentence length and sentence complexity. Length and complexity are considered together according to a numeric weighting system. It is a modified combination of two previous measures, the mean length of response (McCarthy, 1954) and the structural complexity score (Templin, 1957).

LCI measure is based on research of Menyuk (1964) Cazden (1965) and Bellugi (1964) and was first synthesized by Shriner (1967). Miner (1969) states that "the LCI was developed out of a discerned need for a more sensitive measure of verbal maturity in children, a measure which concurrently assesses sentence length and complexity."

The child's score is the sum of noun phrase (NP) points plus verb phrase (VP) points plus additional points (AP) for each sentence divided by the number of sentences (NS). $LCI = NP + VP + AP / NS$. The rules for scoring the LCI as used in the present study are reported in Scoring Procedures for the Length-Complexity-Index: A Preliminary Report (Miner, 1969).

2. Mean-length-response (MLR) = The rules for scoring the mean-length-response have been defined by Templin (1957) following the McCarthy (1930) procedure.

3. TNW and NDW = The total number of words and number of different words are measures obtained by means of a specially written computer program (IBM 1620). Each word is tallied for occurrence, for frequency of occurrence and the words alphabetized. TNW equals the sum of the frequency of occurrence tallies and the NDW equals the sum of all the different words tallied.

F. Examiner Reliability

The first twenty responses from four subjects in each of the groups were transcribed twice and analyzed twice for LCI and MLR. At least three months elapsed between the original and final transcription and analysis. Intrascorer agreement for the LCI was 97.0 per cent and 95.5 per cent for the MLR. This high level of agreement attests to high intrascorer agreement for the transcriptions.

G. Data Analysis

The nature of the data in this study is interval and the appropriate assumptions are made concerning sampling and distribution for the use of parametric statistics. Statistical analyses were carried out by means of the IBM 1620 computer.

CHAPTER IV

RESULTS

The present study was designed to provide answers to the following questions:

1. Do toys, pictures of toys and films of the objects represented by the toys, when used as stimuli to evoke samples of verbal language from young children, yield language samples that are significantly different in length and grammatical complexity as measured by the length-complexity-index (LCI)?
2. Do toys, pictures of toys and films of the objects represented by the toys, when used as stimuli to evoke samples of verbal language from young children, yield language samples that are significantly different in average length of utterance as measured by mean-length-response (MLR)?
3. Do toys, pictures of toys and films of the objects represented by the toys, when used as stimuli to evoke samples of verbal language from young children, yield language samples that are significantly different in the total number of words (TNW) uttered and the number of different words (NDW) uttered?
4. How do the results from different language studies using the same language measures but different stimuli to evoke the language samples compare in terms of length and grammatical complexity, average length of utterance, total number of words and number of different words?

The variability in the four language measures applied to the language samples for each of the stimulus media is summarized in Table 2 in terms of means and standard deviations. Neither the means nor the standard deviations appear to be greatly different within the LCI and MLR measures for the three media. However, in the case of TNW and NDW both toys and films are higher than pictures but compare favorably with each other.

To determine the significance of the differences observed in Table 2 the LCI measures were subjected to analysis of variance (Downie and Heath, 1965). The results are shown in Table 3. None of the F ratios obtained is significant. The MLR measures were subjected to a similar analysis and the results are reported in Table 4. Again, none of the F ratios obtained is significant.

TABLE 2.--Summary of measures of variability for the length-complexity-index, mean-length-response, total number of words and number of different words for each of the three stimulus media

	LCI		MLR		TNW		NDW	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Pictures	10.659	7.830	6.888	3.361	367.111	75.712	129.111	25.761
Toys	11.019	6.480	7.915	3.894	559.778	138.995	157.889	26.789
Films	10.416	8.369	7.073	3.279	554.000	119.126	165.556	25.764

TABLE 3.--Summary of analysis of variance of the length-complexity-index measures for pictures, toys and films

Comparison	Source	Sum of Squares	<u>df</u>	Mean Square	<u>F</u>
Pictures versus toys	Between	5.813	1	5.814	.111
	Within	9296.824	178	52.229	
Pictures versus films	Between	2.672	1	2.672	.040
	Within	11820.967	178	66.410	
Toys versus films	Between	16.368	1	16.368	.289
	Within	10082.630	178	56.644	

An F at 3.89; 1 and 200 df is required at the .05 level.

An analysis of the significance of the differences obtained for total number of words and number of different words was performed using the Student's t (Downie and Heath, 1965). These results are reported in Table 5. Both of the measures for both toys and films were significantly higher than those obtained for pictures. However, toys and films were not significantly different from each other in either measure.

TABLE 4.--Summary of analysis of variance of the mean-length-response measures for pictures, toys and films

Comparison	Source	Sum of Squares	<u>df</u>	Mean Square	<u>F</u>
Pictures versus toys	Between	47.507	1	47.507	3.552
	Within	2381.004	178	13.376	
Pictures versus films	Between	1.546	1	1.546	.139
	Within	1984.030	178	11.146	
Pictures versus toys	Between	31.912	1	31.912	2.436
	Within	2331.907	178	13.101	

An F at 3.89; 1 and 200 df is required at the .05 level.

TABLE 5.--Summary of the comparison of the difference in observed means for total number of words and number of different words for pictures, toys and films

Comparison	Total Number of Words		Number of Different Words	
	Means	<u>t</u>	Means	<u>t</u>
Pictures versus toys	367.111	3.443*	129.111	2.190*
	559.778		157.889	
Pictures versus films	367.111	3.745**	129.111	2.829*
	554.000		165.556	
Toys versus films	559.778	.089	157.889	.583
	554.000		165.556	

* .02 < p < .05; df = 16

** .001 < p < .01; df = 16

Table 6, page 30, shows an item analysis within each of the three stimulus media for the measures total number of words and number of different words. Within each medium the items are ranked from most to least in terms of the measure. While no attempt has been made to attach significance to any of the rankings it is interesting to note that some items tend to stay toward the top of the rankings in each medium while others tend to stay lower in the rankings.

Table 7 compares the four language measures used in the present study with the same measures obtained in two other studies. The subjects in each of the three studies were of the same age. However, the subjects in the Barlow study were of lower socio-economic status compared to the other two studies. In the present study and the Strandberg and Griffith study the examiner who evoked, transcribed and analyzed the language samples was the same.

TABLE 7.--Comparison of language measures from different investigations using different stimuli to evoke language samples. The measures reported are means

Investigator	Stimulus	LCI	MLR	TNW	NDW
Strandberg	Pictures	10.659	6.888	367.111	129.111
	Toys	11.019	7.914	559.778	157.889
	Films	10.416	7.073	554.000	165.556
Barlow	Reading Readiness	5.99	5.34		
	Pictures	5.74	5.14		
		6.39	5.65		
Strandberg & Griffith	Pictures of Toys	6.900	5.608	326.67	123.67
	Pictures taken at home	8.431	5.808	455.50	144.17
	Pictures taken at home following special training	11.821	6.805	449.17	141.00

TABLE 6.--Rank order of items within the three stimulus media for total number of words and number of different words

Total number of words				Number of different words							
No.	Pictures	No.	Toys	No.	Films	No.	Pictures	No.	Toys	No.	Films
460	dog	770	telephone	809	airplane	163	dog	204	airplane	209	airplane
438	tractor	698	airplane	688	cash reg.	152	fire truck	182	telephone	202	cash reg.
430	horse	661	fire truck	587	fire truck	145	tractor	167	car	176	fire truck
414	fire truck	619	tractor	543	dog	140	horse	167	dog	169	car
391	cash reg.	595	car	540	car	139	cash reg.	164	tractor	168	tractor
360	airplane	512	dog	491	tractor	134	airplane	163	fire truck	155	dog
315	car	478	horse	470	telephone	116	car	136	horse	144	horse
254	piano	371	piano	452	horse	88	telephone	122	piano	134	telephone
242	telephone	334	cash reg.	406	piano	85	piano	116	cash reg.	133	piano

CHAPTER V

DISCUSSION

The principle question posed in this investigation is whether the stimulus used to evoke language samples from children can significantly influence the language measures ultimately applied to the samples. A review of the literature has revealed that almost every investigation uses stimulus materials that are different from previous studies. In the present study the stimulus was controlled as the independent variable and the examiner and procedural variables were held constant. Four language measures served as dependent variables.

The three stimulus media did not yield significantly different length-complexity index measures nor significantly different mean-length of response measures. Mintun, mentioned earlier, did find significant differences in LCI measures between pictures and films. Films evoked language samples with higher LCI scores. However, her MLR measures were not significantly different. Mintun also reported significant differences in total number of words and number of different words among the three media, with toys yielding the highest values for both measures followed by films and then pictures. In the present study, both toys and films were significantly higher for both measures than pictures but they were not different from each other for either measure. It must be kept in mind, however, that Mintun's subjects were older mentally retarded children. Their mean CA was 10 years and their mean MA was approximately 5 years 8 months. The present study used normal four and five year old subjects.

There is no reason to expect that normal and mentally retarded children even of the same mental age would respond in the same fashion to the stimulus media. In spite of their reduced learning ability the mentally retarded children had had different experiences than the normal children which could possibly account for the differences in their reactions. For example, the normal children may have had more experiences with films making them less novel, less 'stimulating'.

It is of considerable importance that in terms of the number and variety of words used by both the normal and mentally retarded children, pictures as a stimulus medium yielded the lowest scores. Apparently, the ability to touch, hold and explore a three-dimensional object or to view a moving picture evokes a different kind of verbal responding than looking at a picture of an object, in spite of the fact the picture is quite colorful and large.

Reference to Table 7 shows that Strandberg and Griffith found essentially the same thing as Mintun and the present study regarding the restrictive effects of pictures of objects on the number and variety of words occurring in the language sample. In their study, however, the children had made the pictures themselves with a camera which might reasonably have made the pictures more appealing and stimulating. This was not the case however.

Table 7 is important for several reasons. With the exception of mean length of response (MLR), other language measures seem to be highly influenced by the stimulus used. The length-complexity-index (LCI), with its high temporal reliability (.80 as reported by Barlow) seems to be especially sensitive to the stimulus. In some instances it nearly doubles.

Compare Barlow's data with the present study, for example. In addition, compare the LCI's obtained by Strandberg and Griffith in which the children were making their own pictures under different circumstances. They report that in some instances the LCI based on a language sample taken for a particular sequence of pictures for a particular child was as high as 30.67. This same study compared to the present study also shows the same restrictive influence that pictures of single objects have on the amount and variety of verbal output. Total number of words and number of different words is lowest for this type of stimulus.

The results of the present study fall somewhat short of the goal of demonstrating the effects of the stimulus on the language sample. The LCI, of the language measures used is the most sensitive to differences in the 'quality' of the sample. It is a more complex measure than the other three. One might, expect then, that it would be more sensitive to changes or influences on language behavior. While this was not the case in this study it has been in other investigations as has been pointed out.

An alternative interpretation of the results is worthy of consideration. The present study and study by Cowan, et al. are essentially an appeal for a standardized procedure for evoking samples of children's language. The present data suggest that when the stimulus, examiner, procedure and verbal directives are carefully controlled, essentially equivalent language samples are obtained. While Cowan, et al. held the stimulus and examiner variables constant, they did not vary the stimulus systematically nor was their procedure completely standardized. The present study has attempted to correct for these differences, making the data from both compatible with regard for the need for standardized methods and procedures.

During the course of the study it became apparent to the examiner that strict attention should be given to each of the critical variables which can affect the sample. A discussion along these lines may be of assistance to others interested in child language in either the clinic or laboratory.

The verbal directives that are ultimately used in evoking language and in sustaining responses are determined in part by pre-training procedures. Since this may be a new experience for some children, a certain amount of learning how to respond is necessary. The essential task is one of calling the child's attention to relevant features of the stimulus to be discussed. Suggestions during the training session which lead the child to discuss apparent features, such as name, color, use and material accomplish this. With a highly verbal child these procedures should be modified. Reinforcement of longer responses in the training session increases the probability of longer responses occurring when the samples are taken. The reinforcement may be either verbal, as "yes" or "that's right" or social, such as a smile or an affirmative head nod. Also it is possible to reduce the number of one word responses by letting the child know that this is not what is required. "Don't just tell me the name, string words together and tell me all about the dog." Careful attention to these directives help shape the child's behavior and are useful in obtaining a more accurate indication of his verbal maturity.

The verbal directives used in the evoking of the language samples should also be carefully chosen. "Tell me about the picture" is not the same as "Tell me what the people in the picture are doing", nor is it the same as "Tell me a story about the picture." Requesting a story may bring

one response from an imaginative child, however, another child may reply, "I don't know any" or "I can't even read yet." Too often, an examiner is given a choice of several directives and uses different ones with different subjects in the same investigation. The directive appears to have influence on the forthcoming response. For example, if you say "Tell me more about the picture" you will undoubtedly get a longer response than if you say "Can you tell me more about the picture?", to which the subject may promptly respond "no".

In Chapter III the selection of the stimuli was discussed. There are further comments that may be of help. Serious consideration was given to the manner in which the toys were to be presented. It was decided that the toy would be set on the table before the child and that he could then handle it or not as he chose. Of the ten children that were presented with toys, none actually played with the item, that is, rocked the doll or flew the airplane. A few touched the item to produce a noise associated with it, e.g., pushed a piano key or turned the dial on the telephone. What is meaningful is that several of the children discussed the toy as it was placed before them and then simply turned it to get another perspective and began to discuss it again. At times they would lean forward and concentrate on a single detail and then verbalize about it. It would appear that seeing the object from another angle is of importance, of course, this would occur in the moving pictures.

As many children are cautioned 'not to touch' photographs, the examiner was eager that the children understand that they were to hold and touch the photograph as much as they liked and this was indicated in the training session. None of the children hesitated to pick up the photograph

and point to the feature they were discussing. Apparently, the size and obvious sturdiness of the photographs influenced this.

There appeared to be little in the literature to indicate procedure and methods of evoking language samples from children using moving pictures. Assumptions have been made regarding the visual literacy of today's youngsters (Debes, 1968). Children have been exposed to many hours of visuals by the time they enter school. The examiner had tested some of these assumptions in an earlier investigation using a still camera. It seemed important to investigate the value of using moving pictures to evoke language samples since children, through television, are constantly stimulated by 'pictures that move'.

If moving pictures are selected as stimuli, careful consideration should be given to the projector used. In the present study, the projector was small and easy to carry, it had automatic threading and rewinding features, it was cartridge-loaded, the image could be projected on a wall or large piece of tag board, the operation was quiet and it produced an image with good resolution at short distances.

The photographer understood the purpose of the investigation and aided in producing films with as few extraneous features as possible. It was necessary to have a person in many of the films, but this was carefully controlled. With the iron, for example, a close-up of a woman's hands were shown ironing a child's dress; with the doll, a child's hands were seen picking up the doll and rocking it. No people nor activities were included in the films of the animals. The horse was seen running in open field and the dog was frisking on a lawn. The vehicles (airplane, fire truck, car, and tractor) were shot from a distance so that the driver would not be too distinctive. Backgrounds were kept as simple as possible.

The examiner had arbitrarily decided that each film should be fifteen seconds in length and then shown as many times as requested by the subject. Information from Kodak indicated that approximately five seconds viewing time was necessary for the subject to orient to a moving object, so the films were twenty seconds in length. If further work is done in this area, the examiner would recommend that a one minute single concept film be used rather than repeated showings of the shorter one. There are many reasons for this. The primary one is that if the film ended in the middle of a verbal response from the subject, he stopped automatically with the film. Children of this age are apparently unable to retain their thought and finish the response with the rewinding and reloading procedures going on. They also have difficulty retrieving the previous thought when the film begins again. A child will sit quietly and watch a one minute film of the same activity but seems reluctant to see the identical film, he knows he just saw, shown again.

The examiner observed that it is difficult for children of this age to tolerate silence. As previously mentioned, the examiner did not engage in spontaneous conversation with the subjects. When the film ended a few seconds were required for it to rewind. During this time the children verbalized about extraneous features in the testing situations and asked questions about the projector. These responses were not included in the language corpus. This suggests that a period of silence might be effective as a stimulus in evoking a sample if it is used in conjunction with other stimuli. The comments regarding the projector might have been eliminated by including a brief explanation about it in the orientation session. During this explanation an attempt should be made to elicit any questions the child might inject later about it's operation.

It is necessary to plan the placement of equipment. The chair height should be correct for the individual child so that the image can be comfortably viewed. The microphone for the tape recorder must be placed close enough to the subject to pick up the verbal responses but far enough from the noisy side of the projector to prevent excessive difficulty in transcription.

Since it is impossible to know in advance what equipment a school has, the examiner was prepared with a white tag board on which to show the films, and an extension cord. If the projector being used is equipped with a three-pronged plug, it is necessary to bring an adaptor plug.

In discussing the films, the children frequently described the action taking place. The films used in this study were of necessity kept extremely simple. However, if extraneous features and activities of known interest to children of this age were included, for example, a children's birthday party or a group of children swimming or playing on a playground, the children would be likely to describe all the various activities taking place.

CHAPTER VI

SUMMARY

This study was designed to determine the relationship between the stimulus used to evoke verbal language samples from children and measures of sentence length, grammatical complexity and number and variety of words uttered. Three stimulus media were used to evoke samples from thirty four and five-year-old subjects. Ten subjects were assigned to each of the three media in such a manner as to counter-balance the groups for age and sex. The contents of the three stimulus media were toys, color photographs of the toys and twenty-second single concept films of the objects represented by the toys. The language samples were evoked following a practice session using a standardized procedure and verbal directives. No limit was placed on the amount of verbalization from the subjects for each of the nine items within each medium. Extraneous verbalizations, however, were not included in the final analysis. Throughout the study the examiner variable was held constant. All samples were tape recorded, transcribed and analyzed by the examiner.

Four language measures were applied to the samples: (1) the length-complexity-index; (2) mean-length-response; (3) total number of words; and (4) number of different words.

The results of the statistical analyses revealed no significant differences among the three stimulus media for both the length-complexity-index measures and the mean-length response measures. However, both the

toys medium and the film medium were significantly higher than the pictures medium in total number of words and number of different words but they were not significantly different from each other.

The measures obtained in this study are compared to the results of three previous studies. Two of these studies employed the same language measures but used different stimuli to obtain language samples from four- and five-year-old subjects. The third study used the same stimuli, language measures and procedures for evoking samples as the present study but with mentally retarded subjects. These comparisons indicate that while measures of average sentence length are not affected by different stimuli, measures of grammatical complexity and sentence length and measures of amount and variety of words vary significantly with changes in stimuli.

While significant differences in measures of sentence length and complexity were not yielded by the different stimulus media, these findings are not necessarily incompatible with the plea for standardized procedures for evoking language samples. On the contrary, systematic control of the stimulus medium along with control of the examiner and procedures evidently results in equivalent language samples. There is a need, however, for further studies of reliability of samples obtained from the same subject for different stimulus media.

Observations and recommendations concerning control of the procedures and the environment in evoking language samples are included. The subject's performance is subject to certain reinforcing events which appear to significantly affect the language sample obtained from him. These comments are included in the hope that they will be helpful to future researchers and clinicians interested in the study of child language.

APPENDIX A

The following toys were used as stimuli:

1. Electric play iron, aqua plastic and steel, with white cord and plug, #317, Wolverine Toy Company, Pittsburgh, Pennsylvania.
2. Baby doll in a pink blanket and pink plastic cradle.
3. Winchester "Shootin Shell" rifle, #0661, Mattel Incorporated, Hawthorn, California. These items were chosen as practice items because of a possible sex bias.

Toys utilized in eliciting verbalizations were:

1. Brown plastic "Thundercolt," #2031B. Louis Marx and Company, Incorporated, GlenDale, West Virginia.
2. Collie dog, black and tan plastic, #101, British Colony of Hong Kong.
3. Jet airliner, friction powered with jet sound, gray metal and plastic with red and white stripe, Frankonia, (Seal of Approval Toys) #7126.
4. Fire engine, red plastic, Engine No. 598, Processed Plastic Company, Aurora, Illinois.
5. Toy cash register, red plastic, push button, model #1501, Tom Thumb, Western Stamping Corporation, Jackson, Michigan.
6. Toy tractor, red metal, #401, Carter Tru Scale Machine Company, Rockford, Illinois.
7. Toy telephone, realistic black desk, dial type, one of a set of Dial Phones #212 intercom set, Brumberger, Brooklyn, New York.
8. Scale model car, 1968 blue Plymouth H-T Jo Han Models, Incorporated, 17255 Moran, Detroit, Michigan.
9. Toy piano, pink, 12 key "grand piano," Schoenhut, BS/12, Japan.

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