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COMPARABILITY OF LANGUAGE SAMPLES
ELICITED IN DIFFERENT SITUATIONS
FROM THE SAME GROUP OF CHILDREN

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the requirements for the
degree of Master of Education

By Noel Norman Hanlon

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ABSTRACT

Language samples were elicited in six different situations from 20 five-year-old children (10 boys, 10 girls) in their first six months at Primary School. The samples of language were analyzed using a number of quantitative and qualitative measures. The qualitative measures used were the noun phrase index (NPI), verb phrase index (VPI), and length complexity index (LCI) developed by Shriner (1967). The data was also analyzed according to number of noun phrases, number of verb phrases, and total utterances.

In the statistical treatment of the analyzed data, correlation-coefficients were obtained between all possible pairs of situations and conditions on each of the quantitative and qualitative measures. A series of t tests was also computed between pairs of situations on each of these measures. The analysis of the results of the quantitative and qualitative measures indicated that the samples of language elicited in the six different situations were not comparable.

Discussion of these results considered a range of factors that may have contributed to the differences noted. Factors related to the nature of the situations, the setting within which the language was elicited, and person factors, such as the effect of the experimenter and the effect of the mother, were considered.

It was concluded that such factors as those mentioned above were integral aspects of the language situation worthy of equal consideration with the language elicited.

INTRODUCTION

The child uses different words and frames different kinds of sentences with every change in environment.... What is needed is a sample of the child's speech sufficiently varied to include all the more typical forms of expression

(Boyd, in McCarthy, 1929; p.590)

What Boyd expressed so clearly almost half a century ago seems to have lost none of its pertinence with the passing of time. Although the importance of the communication situation on the type of language elicited has been commented on by various researchers, to the writer's knowledge there have been no studies that have compared language samples elicited from the same children in a number of different situations. A strategy commonly used to elicit a language sample involves the subject responding to a stimulus picture or object presented by the experimenter with a minimum or absence of verbal cueing. The sample thus obtained is then used as the basis for making generalizations about the characteristics of that individual's language performance. If the communication situation is of significance, however, then language elicited in such situations where the interpersonal factor is minimized may not be typical of the language that a person normally uses.

A number of the studies reviewed below made specific, albeit passing, reference to differences in the language performance of their subjects, either from situation to situation or when interacting with different people. In all of these cases, however, such observations were incidental to the main purpose of the respective studies. Nevertheless, in making such references the studies draw attention to the importance of differing communication situations and suggest, as Griffith (1970; p.438) has so aptly stated, that:

... it seems premature to conclude that verbal output in one stimulus situation is representative of verbal output in nearly all situations.

The importance of child language as an area of study is such that the question of language sampling situations raised by the comments of Boyd and Griffith is worthy of further investigation. It may well be that whatever the nature of the communication situation, both the quantitative and qualitative aspects of the language elicited remain constant. However, it may also be that these aspects differ from situation to situation and that to treat as a homogeneous unit utterances elicited in a number of different situations may render indistinguishable important variations in the overall pattern of the individual's language performance.

This study seeks to move in the direction of clarifying some of these issues by comparing oral language samples elicited from the same group of 20 five-year-old children in a number of different communication situations.

Organization of the Dissertation

This dissertation presents the findings of a study that examined the comparability of oral language samples. There are five main chapters.

Chapter I contains a review of the literature that considers the influence of the communication setting on the development and production of language, and notes some of the methodological strategies employed by researchers in the area of child language.

Chapter II is concerned with the aim and design of the study and presents a detailed account of the procedures adopted in selecting the subjects for the study and the techniques involved

in the collection of the language samples. This chapter also details the statistical techniques used to determine the reliability of the data and to treat the group data.

Chapter III is concerned with the results obtained from the three quantitative measures: the number of noun phrases, the number of verb phrases, and total utterances. The chapter also presents a discussion of the major findings that resulted from the application of the quantitative measures.

Chapter IV presents the results and related discussion with reference to the three qualitative measures: noun phrase index, verb phrase index, and length complexity index.

Chapter V considers the implications that arise from the findings of the study and attempts to arrive at some conclusions related to the validity and reliability of these findings.

CHAPTER I

REVIEW OF THE LITERATURE

The review of the literature that follows is concerned with:

- 1) the influence of the communication situation upon language,
and
- 2) noting the methodological strategies that have been employed
in previous studies.

The Communication Situation

The influence of the communication situation on language has been commented on by various researchers, and it seems fairly well established that language does not develop in an interpersonal vacuum (Boyd, 1927; Williams & Naremore, 1969; Howard, Hoops, & McKinnon, 1970). The essence of this commentary was captured by Ervin (1964, p.500) when she said:

Spoken language is, almost without exception, learned in a social setting. This setting includes material and behavioural referents for speech, rewards for speaking in a certain way about specific topics, and feelings towards those who hear and towards those who provide models of speech.

The effects on language of such factors as socio-economic background (Cazden, 1968; Bernstein & Henderson, 1969), ethnicity (Entwisle, 1968), mental retardation (Newfield & Schlanger, 1968), and deafness (Brannon and Murry, 1966) are well documented in the literature. However, the influence of the size of the communication group, the closeness of the relationship between members of the communication group, the opportunities to use language, the stimulus potential of events within the communication situation, are other factors that may not have received the attention warranted

(Williams & Mattson, 1942; FitzSimons, 1958; Becker, Bavelas, & Braden, 1961; John & Goldstein, 1964).

Williams & Mattson (1942) for example, attempted to determine the effect of increasing the size of the play group of nursery school children upon their language. Of the social groups investigated by Williams & Mattson, they found that the combination of two children and an adult resulted in more talking, more words per sentence, and more 'friendly' intercourse than any of the other sized groups studied.¹

If language performance is susceptible to such influences as those outlined above, then perhaps studies in the field of children's language should be concerned not only with the characteristics of the language elicited, but also with such factors as the number of persons involved in the communication situation and the types of language situation sampled. The review of the literature below is concerned primarily with the experimental design and methodological considerations of studies that are representative of research in the field of children's language.

Methodological Strategies

A review of the literature suggests that researchers use three main strategies for eliciting the language data they require:

- 1) some studies use minimal interaction,
- 2) some studies elicit samples of the child's oral language in interpersonal interaction situations, and
- 3) some studies use a combination of the first two methods.

1 In the experimental play situation each child had a turn at all of the following: to play freely alone with the materials provided; to play alone with the experimenter; in a group composed of one other child and the experimenter; and also in a group composed of two other children and the experimenter. The report did not indicate whether the order of participation in these different groupings was varied.

For the purpose of this study the term minimal interaction situation is used to refer to any situation where oral language is elicited from the subject/s using pictures, objects, or other impersonal forms of stimulus. Although the experimenter may use prompts (e.g. 'Anything else?', 'Can you tell me anything more?') as a means of eliciting a maximum language sample, he acts primarily as a passive administrator rather than adopting an active participating role in the eliciting situation.

The term interpersonal interaction situation is used, in this study, to refer to any situation where the language sample obtained is derived from the oral language used by the subject/s in communication with one or more persons, where all persons involved in the situation are active participants.

Minimal interaction situations. A number of studies have used stimulus pictures to elicit language from their subjects (Darley & Moll, 1960; Cowan et al., 1967; Shriner & Sherman, 1967; Wilson, 1969). Although the purpose for which the language data was collected may vary in the studies listed above, the method used to elicit the language sample was similar.

Darley & Moll (1960), for example, obtained speech samples from 150 white, five-year-old kindergarten children. Fifty consecutive responses were elicited and tape recorded in each child's home using the Children's Apperception Test cards. These cards were presented one at a time, with the examiner engaging the child with neutral comments such as 'Tell me about this picture'. Typewritten transcripts of the recorded responses were used for the purpose of analysis.

The stimulus picture from the Picture Story Language Test (PSLT) was used by Wilson (1969) to elicit a language sample from 40 subjects ranging in age from three to 17 years. The primary purpose of her study was to determine whether the PSLT, devised to evaluate written language samples, could be used as a standard method of eliciting a representative sample of oral language. Each subject was shown the picture and asked to tell a story about the picture. They were also told that they could look at the picture while they were telling the story. Wilson concluded that a representative sample of oral language was obtained and that scoring procedures for oral language samples could be standardized from the measures used in the PSLT.

Ten stimulus pictures were used by Cowan et al. (1967) to elicit spoken language from their sample of 96 five, seven, nine, and 11-year-old girls and boys. The pictures were taken from a popular magazine and showed varying numbers of adults and children engaged in different activities. When the results for the stimulus pictures were arranged in order according to the average mean length of response, the difference among pictures was found to be statistically significant. Although the authors could offer no reason for the difference in length of utterance that the pictures stimulated, they suggested that the different stimulus content might elicit sentences of different complexity and that the difference in length may follow from the complexity of the sentence.

The stimulus pictures, however, may be carefully selected by the investigator who has a particular type of speech in mind. A case in point is a study carried out by Hawkins (1969) who investigated specific differences in the speech of middle class children

and working class children. He used a sample of 124 middle class five-year-olds. Two tasks were used to elicit language. The first task consisted of a series of four picture cards which together told a little story. This task was designed to elicit narrative speech. The second task included three postcard size reproductions of paintings. This task was designed to elicit descriptive speech. Although the purpose of the study was to compare the performance of the two social class groups, an examination of the results indicated intra class differences between the two tasks. Whether or not these differences were statistically significant was not indicated in the results.

Stimulus pictures were also used by Berryman (1969) to elicit language, but her study introduced another variable: the influence of the type of question asked. Berryman's study used four oral stimulus sentence types: nonstructured interrogative ('What do you see in this picture?'), nonstructured imperative ('Tell me what you see in this picture.'), structured interrogative ('What is the boy doing in this picture?'), and structured imperative ('Tell me what the boy is doing in this picture.'). While Berryman found that no statistically significant differences in length or reaction time of responses occurred as a function of sentence type, she did find that a higher frequency of vocal response ($p < .05$) occurred after the interrogative than after the imperative stimuli.

Although other studies (Quereshi, 1967; Williams & Naremore, 1969; Howard, Hoops, & McKinnon, 1970; Hawkins, 1971) have used different types of minimal interaction situation to elicit language samples - such as discussion about selected topics, and making up stories - the use of stimulus pictures appears to be the most widely

used technique.

Interpersonal interaction situations. Another group of studies have relied for their data on language elicited during interpersonal interaction situations. Some of these studies sample the child's oral language used in play situations (Smith, 1935; Moore, 1947; Kellmer-Pringle & Tanner, 1958), while others have used various adult-child interaction situations (Moustakas, Sigel & Schalock, 1956; Walters, Connor, & Zunich, 1964; Baldwin & Frank, 1969; Granowsky & Krossner, 1970).

Smith (1935) used records of conversations from 305 children, ranging in age from 18 - 72 months, as the source for her data. The conversations had been recorded in one of two situations: either while the child was engaged in play with other children, or while the child was alone with adults in a home situation. In neither case did the experimenter converse with the child, as the aim was to secure a record of the child's "spontaneous" speech. Detailed analysis of the language elicited included the influence of such factors as sex differences, mental age, social class, order of birth, and the situation in which the language was elicited. Smith found that in the situation where the child was alone with adults the subject used longer sentences, more questions, more complex and compound sentences, and fewer imperative sentences. Only the difference related to longer sentences, however, was found to be statistically significant.

The influence of environment on children's speech was investigated by Moore (1947). She used as subjects 51 children of pre-school age (11 children from an orphanage and 40 children who attended either a Day Care Centre or a Nursery School). Fifteen two-minute samples of spontaneous speech were gathered for each child in both indoor and

outdoor play situations.

A study by Baldwin & Frank (1969) of the syntactic complexity of the language a mother and child use when talking to each other involved the collection of language samples from the mothers and children together in a play session. The room in which the mother-child interactions occurred contained a number of different types of toys. A facet of the study worthy of note related to the possible effect these different toys had on the language used by the mother-child pairs. For example, if one mother-child pair had played only with a doll family while another pair had played with a jig-saw, the fantasy often associated with doll play might lead to the production of more complicated sentences than the conversation about the jig-saw. In this case any differences noted between the two pairs might not reflect any basic difference in the complexity of oral language, but possibly differences in the stimulus potential of the objects played with. To investigate this problem, Baldwin & Frank categorized each sentence according to the toy being played with and also according to the object which was the subject matter of the sentence.

Combination of minimal interaction and interpersonal interaction situations. In contrast to the studies discussed in the sub-sections above, an experimental design that gathers language data from both minimal interaction and interpersonal interaction situations has been used by other researchers (Menyuk, 1963b; Cazden, 1967; Gerber & Hertel, 1969; Lee & Canter, 1971).

Syntactic structures in the language of children have been studied by Menyuk (1963b). Her subjects were 48 private nursery

school children and 48 first grade children. Menyuk recorded speech in three stimulus situations: responses to a projective test (The Blacky Pictures), a conversation with an adult, and conversation with peers generated by role playing in a family setting. In addition to these three situations, the children were observed in their school-room for a period of two hours. This additional language sampling was done for the purpose of cross-validation, to determine whether some syntactic structures were used only in the classroom situation. Although Menyuk drew attention to the possibility that differences in the language used may occur between different situations, she made no mention as to the results of her cross-validation measures.

Cazden (1967), in her study, collected a number of speech samples. In contrast to a common research design which gathers samples from many children in one situation, Cazden and an associate collected speech samples from two children in eight situations ranging from free conversations and telephone interviews, to story re-telling. Both children, a boy and a girl, were in a Boston Summer School following a year in the first grade. At the time of publication, Cazden had only analyzed the samples for length of utterance in each situation separately, and for use of conjunctions in the total output for each child. Two generalizations drawn by Cazden have particular relevance for the present study. First, the two children differed in their response to particular situations. Second, the situational variation for each child was greater than the over-all difference between the two children. The latter generalization again draws attention to situational variations in language characteristics, but like the study by Menyuk (1963b) does not explicitly compare language elicited in minimal interaction situations with that elicited in interpersonal

interaction situations.

A number of criteria which a language sample should meet have been established in a study by Lee & Canter (1971). Among these criteria they noted the need for a conversational setting and the use of stimulus materials (pictures and toys) in which the child was interested.

A study of language deficiency in four and five-year-old disadvantaged children by Gerber & Hertel (1969) involved oral language samples elicited in three different types of situation: a conversation in an adult-child relationship, a story telling situation using a family of dolls, and responses to a number of pictures from the Peabody Language Building Kits. The language elicited in the different stimulus situations was treated for the purpose of analysis as a unitary language sample without further consideration of the different situations in which the sample was elicited.

Although a number of the studies discussed above made reference to differences in the language performance of their subjects, either from situation to situation or when interacting with different people, such observations were incidental to the main purpose of the respective studies. The present study, however, takes as its main purpose an examination of the comparability of oral language samples elicited in a number of differing communication situations from the same group of subjects.

CHAPTER II

AIM AND PROCEDURES

This chapter is concerned with describing:

- 1) the aim and design of the study,
- 2) the subjects,
- 3) the data-collection plan,
- 4) the methods of analysis.

Aim and Design of the Study

The aim of this study was to investigate the comparability of samples of children's oral language elicited in a number of different stimulus conditions and situations. To this end, oral language samples were elicited from 20 five-year-old children and the samples thus obtained were analyzed using a number of quantitative and qualitative measures.

Subjects

The subjects of this study were 20 five-year-old children in their first year at Primary School. Table I shows age and time at school characteristics for the total group and for the boys' and girls' sub-groups. This age group was selected as presenting the earliest convenient opportunity to sample from a group representative of the total population at a particular level.

The following four criteria were established to guide the selection of subjects for the study:

- 1) The subjects were all to be pupils of either of two Normal Primary Schools attached to the local Teachers College.

The two schools were chosen;

TABLE I

AGE RANGE, MEAN AGE, TIME AT SCHOOL RANGE,
AND MEAN TIME AT SCHOOL FOR BOYS AND
GIRLS SUB-GROUPS, AND FOR TOTAL GROUP

Variables	Boys n=10	Girls n=10	Total Group n=20
Age Range	63-65 months	63-66 months	63-66 months
Mean Age	63.9 months	64.2 months	64.1 months
Time at School Range	3 - 5 months	3 - 5 months	3 - 5 months
Mean Time at School	3.8 months	3.7 months	3.7 months

- (a) because of their close proximity to a University where one phase of the data collection was to occur,
 - (b) because as Normal Schools they had available facilities where children could be taken from the classroom to work in undisturbed conditions,
 - (c) because the children from these Schools frequently worked with students and lecturers from the local Teachers' College, and it was felt that the subjects were likely to behave in a more natural manner than if they had come from a school where contact of this type was minimal.
- 2) The children selected were required to have had at least three months but not more than six months experience at school. The lower limit was established to provide a settling-down time for all the children, some of whom may not have had prior experience in an organized educational setting. The six month upper limit was set in an attempt to establish as homogeneous a group as possible with regard to age. It was further felt that the influence of the school itself on language performance would not have had too great an effect in this period of time. Similar limits have been set by other researchers (Gerber & Hertel, 1969).
- 3) The subjects were to be at least 5 years of age but not older than 5 years 11 months. As Table I indicates the oldest child, in fact, was only 5 years 6 months and, although an upper limit of six months attendance at school was set, all the subjects had been at school between 3 and 5 months.

- 4) The subjects were to be of European descent. This particular criterion was established to again maintain as homogeneous a group as possible. The two schools involved in the study drew their pupils from similar residential areas.

The following procedure was used to assemble the sample of 20 children (10 boys and 10 girls) from a population of 43 children (19 boys and 24 girls) who met the criteria established above:

- 1) The population was arranged into two sub-populations (boys and girls) in random order using Kendall & Smith's tables of random numbers (Popham, 1967; pp.381 - 385).
- 2) The mothers of the first 10 girls and the first 10 boys on each randomized list of names were circularized asking for their co-operation and participation in the study.¹
- 3) If a rejection form was received from a mother, a circular was sent to the mother of the next boy or girl on the list of potential subjects.

This procedure was followed until the required sample was assembled. Of the 19 boys in the population, 11 circulars had to be sent to obtain the sample of 10 boys, and in the case of the 24 girls 13 circulars had to be sent to obtain the sample of 10 girls.²

1 Appendix A shows details of the circular sent to the mothers of the children selected for the study. A form was included on the circular to be returned to the investigator indicating the mother's willingness or otherwise to participate in the study.

2 These 13 circulars included two where the mothers had indicated willingness to participate in the study but were shifting away from the school district before the study would be completed. For this reason they were removed from the sample.

The Data-collection Plan

The study was designed to cover four phases: an initial phase, a procedural phase, a data-collecting phase, and a phase for the interpretation of results.

1) The initial phase. During this phase the preliminary ideas that had stimulated the study were researched more fully and the structural details of the study developed.

2) The procedural phase. The administrative details associated with the study were finalized during this phase. The necessary approval was sought from and granted by the schools and controlling educational authorities concerned. The parents of the children selected, as described above, were also approached individually and the intention of the study was explained in very general terms. The real purpose of this individual meeting was to establish rapport with the mothers who would be participating during the data-collecting phase. The reason for not explaining the aim of the study too specifically was to avoid, to the greatest extent possible, predisposing the mothers to behave in a manner that was not typical of their normal interaction with their children.

3) The data-collection phase. The data-collection plan was guided by the principle that the data should be collected in the shortest possible time. The justification for this lay first, in support of one of the criteria by which the sample was selected; namely that the children should have been at school not less than three months and not longer than six months when the data-collection commenced. And second, it was hoped that the shorter the period of time during which the data was collected, the more likely any

practise effect the added school experience might have would be minimized. In fact, the investigator was able to complete the data-collection within a six week period of time.

The data-collection plan involved the sampling of oral language in three major conditions: a condition where the investigator was the passive administrator of the stimulus requirements (the child condition); a condition where the investigator actively participated in the oral language situation (the child-adult condition); and a condition involving the child in interaction with his or her mother (the mother-child condition).

i) The child condition. In this condition samples of oral language were gathered from each child in two situations, one using the Children's Apperception Test (CAT) stimulus pictures, and the other a Doll-tell-a-story situation. In the first situation the first nine of the ten pictures of the CAT were used.

The pictures were shown to the subject one at a time. Before the series of pictures was shown the following general instruction was given:

'I am going to show you some pictures one at a time and I want you to tell me what you can see in each of the pictures.'

Before each picture was shown the following supplementary instruction was given:

'Tell me what you can see in this picture.'

The intention in this situation was to elicit as many responses as possible and yet, at the same time, refrain from specific prompting (for example, 'What is the monkey trying to do?'). A selection from the following list of cues was used:

'Can you tell me anything more?'

'Anything more?'

'Anything else?'

The cues were repeated until the child indicated that there was nothing more he or she wished to say.

The Doll-tell-a-story situation involved the use of three dolls; a girl doll, a boy doll, and a dog doll.¹ The subject was given the following instructions:

'I want you to make up a bedtime story for a Teddy Bear who is going to sleep. I want you to tell your Teddy Bear a story about a girl, a little boy, and a dog.'

As each of the dolls was mentioned the investigator took the doll from behind a screen and placed it in front of the child. The list of cues used for the CAT situation was also used during this situation. Again, the criterion was to elicit as much oral language as possible without specific prompting.²

The order of presentation of these two tasks was varied. Half of the boys and a half of the girls were given the situations in the order CAT stimulus pictures followed by the Doll-tell-a-story situation. For the other half of the sample the order was reversed. The purpose of this was to counterbalance any order of presentation effect that might occur. Generally, an interval of at least a day

1 The 'girl' was a 12-inch vinyl plastic doll with long, curly, brown hair and dressed in a printed, cotton sun-frock. The 'boy' was a 9-inch vinyl plastic representation of the cartoon character Charley Brown. The 'dog' was 9 inches in length and made from white nylon fur fabric with black ears and tail of the same material.

2 However, as will be discussed later, the investigator was not entirely successful in being "neutral" in this task and in terms of utterances elicited the task generally did not prove to be very productive.

occurred between the administering of the two situations.¹

ii) The child-adult condition. A further sample of language was elicited in a situation which involved the investigator interviewing the subjects in matched pairs according to sex and school. That is, a boy from School A was paired with another boy from School A, and a girl from School A was paired with another girl from School A, and so on. In two cases, because there was an odd number of boys or girls in one school, a partner was selected from the randomized list of subjects prepared at the outset of the study. That is, the next boy and the next girl from that particular school on the ordered list of subjects was selected as a substitute partner. The comments of this partner were recorded in the same way as for the subject but were omitted from the data analysis procedures.

Several researchers (Sampson, 1956; Cazden, 1967; Williams & Naremore, 1969) have made mention of the types of topics discussed with the children in their studies. The selection of topics for discussion in the interview situation of this study was guided by this earlier work.

Discussion of the topics was initiated by using the following questions:

'What do you like doing at home?'

'What have you been doing at school today?'

'Have you any pets at home?'

'Do you like going away for trips and holidays?'

1 For 19 of the 20 subjects the interval ranged between one and six days. For the other subject it took the investigator a considerable period of time to establish rapport with the child and the tight schedule forced the investigator to administer the two situations on the same day.

'Tell me about a story (or T.V. programme) you have read (seen)?'

'Have you a toy (game) at home that you like playing with very much?'

All pairs of subjects were exposed to this same set of initiating questions and in the same sequence. However, numerous supplementary questions were asked in relation to the individual responses given by the children. The guiding criterion for this particular situation was that the investigator should attempt to elicit as much oral language as possible through directed questioning and supporting comments.

iii) The mother-child condition. The final samples of oral language were elicited from a condition involving the mother and child interacting in three situations involving a picture discussion, a shape construction task, and the construction of a jig-saw puzzle.¹ The order in which these situations were presented was also varied.

It was intended that the mothers should attempt to stimulate and elicit as much language as possible from their sons or daughters. The instructions given to the mothers were framed with this purpose in mind.

For the picture discussion the mothers were instructed as follows:

'Here is a picture that I want you to discuss with I want you to think of this as a picture in a book at home and you want to tell you as much as possible about the things happening in the picture. I want you to encourage to talk about this picture in the way you would when talking to her/him at home about things that interest you both.'

1 Appendix B shows photographs of the three tasks involved in this condition.

The mother was given the following instructions before the 'Mr Space Man' shape construction was presented:

'For this game I want you to discuss with the shapes and colours as he/she makes up the man. Try to get to talk about the shapes, what they look like, what they remind him/her of, what else you could do with them, and so on. Ask why he/she has picked the shape and colour that he/she has.'

Instructions given to the mothers for the 'Jig-Saw' situation were as follows:

'Before you break the jig-saw up talk to about what is happening in the picture. Then break the jig-saw up and make it together. While you are doing this talk to about the parts, where you will put them, why you will put them in this place, what you can see on the parts, and so on. Encourage to talk as much as possible about the jig-saw.'

The order in which the three situations were presented was varied. One-third of the subjects discussed the picture first, another third discussed the picture second, and the other third discussed the picture last. The order of the other two situations varied similarly. The purpose of varying the order was the same as that referred to in the discussion of the first condition (p.19).

Time allocation. In all of the situations within the various conditions the major objective was to elicit as much oral language from the subjects as possible. Therefore, no time limit was established for any of the situations and the investigator or mother used their judgement to decide when the child had contributed as much as could be expected in any single situation.

Methods of Analysis

This section deals with:

- 1) The procedures used to score the raw data,

- 2) The statistical techniques used to:
 - i) determine the reliability of the data,
 - ii) treat the scored data.

1) Scoring procedures. A number of measures have been used to analyze children's language samples. Some of these measures have been based on verbal output (Mean Length of Response and Number of Different Words) and others on structural analysis (Developmental Sentence Types and Structural Complexity of Response). A new language measure, the length complexity index (LCI) has been developed by Shriner (1967). This classification system attempts to measure both sentence length and sentence complexity together according to a weighted numerical system. It is the LCI that has been used as a primary measure to analyze the language samples in this study.

The temporal reliability of the LCI has been investigated by Barlow & Miner (1969) and they concluded that the LCI was not as variable as the Mean Length of Response (MLR) and that LCI tended to measure children's language output more reliably over time. Sharf (1972) investigated a number of language measures based on verbal output or structural complexity, including the LCI. Sharf noted that although each of the language measures he investigated gave a reliable measure of language growth, the structural analysis measures (such as LCI) provided a more detailed kind of language description.

A statement on the scoring procedures for the LCI has been prepared by Miner (1969) and this provided the reference for the scoring procedures adopted in this study.¹ From the tape recordings

1 Appendix C contains a summarized version of Miner's scoring procedures.

of the interviewer sessions typescripts were prepared and scored. Individual and group results were calculated for each of the six situations and for the three conditions on a number of measures.

In all, six measures were computed from the scored typescripts. Three of these were quantitative measures and three were qualitative. The quantitative measures employed were number of noun phrases, number of verb phrases, and total utterances. These were obtained by counting the noun phrases, verb phrases, and total utterances produced by individual subjects in each of the six situations. This data was noted on individual record cards from which group data was later compiled. The qualitative measures employed were noun phrase index (NPI), verb phrase index (VPI), and length complexity index (LCI). The formulas for obtaining these indices are contained in Appendix C.

2) Statistical techniques. These are considered with reference to:

- i) the reliability of the data,
- ii) the statistical treatment of the group data.

i) The reliability of the data. The reliability of the data was tested in two ways:

- a) transcript reliability,
- b) scoring reliability.

a) Transcript reliability. The problem of the reliability of transcripts typed from tape recordings has been raised by Winitz (1959) and Siegel (1962), and because any inaccuracy in the transcribing of language samples obtained could affect the scoring of

the samples, a transcript reliability was calculated. The tape recordings of six of the subjects for one of the condition situations were re-transcribed by another assistant. The following formula was used to compare the transcripts:

$$\frac{\text{No. of agreements} - \text{no. of disagreements}}{\text{Total no. of comparisons}} \times \frac{100}{1}$$

Since the purpose of this reliability measure was to determine the accuracy of the transcript for scoring purposes, the criterion for deciding disagreements was based on the comparison of the grammatical classes involved. For example, under the scoring procedures of the study 'bear' and 'bee' would receive the same score and on the transcript comparison this would not be counted as a disagreement. However, 'bear' and 'bears' would receive different scores and as such this comparison would be classed as a disagreement. For the six transcripts compared, the percentage agreement ranged from 89.74 to 100 with a mean percentage of 96.23, thus indicating a high inter-typescript agreement.

b) Scoring reliability. For reasons similar to those outlined above, scoring reliability was also measured using the same formula as for transcript reliability. Agreements and disagreements resulted from comparisons of the seven unit scores for each utterance.¹ The transcripts prepared for the transcript reliability measure were used as the basis for the scoring reliability measure. Where disagreements occurred between the original and the comparison typescripts, the latter was revised to make it identical to the

1 The unit scores were Noun Phrase One points; Noun Phrase Two points; Verb Phrase One points; Verb Phrase Two points; Conjunctions points; Negatives points; Questions points.

original transcript. The scoring reliability percentages ranged from 85.22 to 95.5 , with a mean scoring reliability percentage of 90.91.

ii) The statistical treatment of the group data. As will be indicated below, it was necessary to use three procedures in the statistical treatment of the group data:

- a) the correlation-coefficient,
- b) an analysis of variance,
- c) the t test.

a) Correlation-coefficient. The primary statistical technique used to analyze the data was the correlation-coefficient. A programme for the Sony Sobax 2550 Electronic Calculator was used to compute the correlations for this phase of the statistical treatment. This programme computed the correlation-coefficient r for ungrouped n paired observations (X_i, Y_i) ($i = 1, 2, \dots, n$) where X_i and Y_i were arbitrary values. The formula on which the programme was based is presented below:

$$r = \frac{\sum (X_i - \bar{X})(Y_i - \bar{Y})}{\left\{ \sum (X_i - \bar{X})^2 \sum (Y_i - \bar{Y})^2 \right\}^{\frac{1}{2}}} = \frac{\sum X_i Y_i - \frac{1}{n} \sum X_i \sum Y_i}{\left\{ \left(\sum X_i^2 - \frac{1}{n} (\sum X_i)^2 \right) \left(\sum Y_i^2 - \frac{1}{n} (\sum Y_i)^2 \right) \right\}^{\frac{1}{2}}}$$

Where $\bar{X} = \frac{1}{n} \sum_1^n X_i$, $\bar{Y} = \frac{1}{n} \sum_1^n Y_i$

Correlation-coefficients were computed on each of the six measures for all paired combinations of situations and/or conditions. On number of noun phrases, for example, correlations were computed between situations 1 and 2, situations 1 and 3, situations 1 and 4, and so on, and also between situation 1 and condition 2, situation 1

and condition 3. On each measure 30 correlations were computed to cover all possible combinations.

b) Analysis of variance. In order to test for significant differences between the six group means on each of the measures a complex analysis of variance was employed. The computation of the required sums of squares involved the use of the following formulas:

$$\sum_r \sum_c (X_{rc} - \bar{X})^2 = \frac{1}{RC} [RC \sum_r \sum_c X_{rc}^2 - (\sum_r \sum_c X_{rc})^2] \text{ for total}$$

$$R \sum_c (\bar{X}_{.c} - \bar{X})^2 = \frac{1}{RC} [C \sum_c (\sum_r X_{rc})^2 - (\sum_r \sum_c X_{rc})^2] \text{ for columns}$$

$$C \sum_r (\bar{X}_{.r} - \bar{X})^2 = \frac{1}{RC} [R \sum_r (\sum_c X_{rc})^2 - (\sum_r \sum_c X_{rc})^2] \text{ for rows}$$

The significance of the F value obtained was determined from a Table of F for .05, .01, and .001 levels of significance.¹

c) t test. The F values obtained from these analyses of variance were all highly significant and a series of t tests was used to determine which of the group means were contributing to the difference obtained. Since the first statistical procedure produced correlation-coefficients, the correlated t formula presented below was used for the various paired combinations of situations on each of the measures:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2} - 2r \left(\frac{S_1}{\sqrt{n_1}} \right) \left(\frac{S_2}{\sqrt{n_2}} \right)}}$$

1 McNemar, Q. (1955) Psychological Statistics. New York: John Wiley & Sons, p389.

Although .05 was set as an acceptable level of significance for this study, findings significant at the .01 and .001 levels are also reported in the results for all statistical procedures.

CHAPTER III

QUANTITATIVE MEASURES: RESULTS AND DISCUSSION

This chapter is concerned with:

- 1) the results for the three quantitative measures,
- 2) discussion of the results for the three quantitative measures.

Results¹

This section presents the results for:

- i) number of noun phrases,
- ii) number of verb phrases,
- iii) total utterances.

Number of noun phrases. Correlation-coefficients, by situation and condition, for number of noun phrases are presented in the correlational matrix in Table II.² The correlations were generally low and positive, suggesting a small but definite relationship, particularly between pairs 1-2 (0.37), 1-3 (0.35), 2-3 (0.36), 1-C₂ (0.35), 2-C₂ (0.36).³ Moderate positive correlations,

1 The degree of relationship between variables, suggested by positive or negative correlations in the results, is indicated within the following limits:

- .21 - .40 low correlation, definite but small relationship
- .41 - .70 moderate correlation, substantial relationship
- .71 - .90 high correlation, marked relationship.

2 The conditions and situations refer to those outlined in the procedural chapter. Condition 1 (the child condition) involved situation 1 (C.A.T.) and situation 2 (Doll-tell-a-story). Condition 2 (the child-adult condition) involved situation 3 (peer-adult discussion). Condition 3 (the mother-child condition) involved situation 4 (picture discussion), situation 5 (shape construction), and situation 6 (jig-saw puzzle).

3 For ease of presentation, the forms 1-2, C₁-C₃, C₁-4 are used to represent correlated pairs of situations, or conditions, or situation and conditions. Where appropriate the obtained correlation is placed in brackets after each pair.

TABLE II

CORRELATION-COEFFICIENTS BY SITUATION
AND CONDITION FOR
NUMBER OF NOUN PHRASES

Situation	1	2	3	4	5	6	C ₁	C ₂
2	0.37							
3	0.35	0.36						
4	0.00	-0.31	0.03					
5	0.06	0.17	0.11	0.69**				
6	0.12	0.02	0.16	0.58**	0.47*			
C ₁			0.41	-0.10	0.11	0.10		
C ₂	0.35	0.36		0.03	0.11	0.16	0.41	
C ₃	0.06	-0.06	0.11				0.03	0.11

* p < .05 level

** p < .01 level

suggesting a substantial relationship, were found between $C_1 - 3$ (0.41), $C_1 - C_2$ (0.41), 4-5 (0.69), 4-6 (0.58), and 5-6 (0.47). The only statistically significant correlations were those between situations 4-5, 4-6, and 5-6.

A low negative correlation was obtained for situations 2-4, suggesting a tendency for a high score by a subject in one of the situations to be matched by a low score in the other situation.¹ As the data for number of noun phrases in Table III indicates, these two situations were quite different in range and mean. A t test indicated that the difference between the group means for the two situations was statistically significant beyond the .001 level.

The most notable feature of the correlations presented in Table II is the dichotomy between situations 1, 2, 3 and situations 4, 5, 6. The correlations obtained for pairs of situations, within either of these two groups, indicated a higher degree of relationship than those correlations obtained for pairs of situations across the groups. The most significant relationships were established by the various combinations of situations 4, 5, and 6.

An analysis of variance was computed to test the significance of the over-all variation of the means for the six different situations, and the results of this analysis are presented in Table IV. The F value obtained was well beyond that required for the difference to be significant at better than the .001 level.² Since the analysis of variance produced a F value that was highly significant, a series of t tests was computed for the various pairs

1 In this regard the terms 'high score' and 'low score' are used to refer to a rank order comparison of the subjects' scores.

2 McNemar, Q. (1954). Psychological Statistics. New York: John Wiley & Sons, p391.

TABLE III

RANGE AND MEAN NUMBER OF
NOUN PHRASES, VERB PHRASES, AND TOTAL UTTERANCES
BY SITUATIONS FOR TOTAL GROUP

Situation	Number of Noun Phrases		Number of Verb Phrases		Total Utterances	
	Range	Mean	Range	Mean	Range	Mean
1	12 - 63	28.1	11 - 60	24.0	10 - 60	25.95
2	3 - 23	9.15	3 - 25	9.3	3 - 22	9.4
3	15 - 56	36.8	17 - 58	34.95	24 - 54	39.0
4	9 - 154	55.2	10 - 152	35.05	15 - 145	58.45
5	14 - 138	47.9	2 - 100	26.75	18 - 139	51.6
6	26 - 117	65.8	21 - 107	51.15	37 - 134	74.6

TABLE IV

A COMPLEX ANALYSIS OF VARIANCE
OF NUMBER OF NOUN PHRASES OF TWENTY SUBJECTS
FROM SIX DIFFERENT ORAL LANGUAGE SITUATIONS

Source of Variation	Sum of Squares	df	Variance Estimate	F
Situations	41224.242	5	8244.848	18.248***
Subjects	24374.825	19	1282.886	
Remainder	<u>42922.925</u>	<u>95</u>	451.820	
Total	108521.992	119		

*** $p < .001$ level

of situations.

The t values for the comparison of group means are presented in Table V, and data relating to range and mean number of noun phrases is included in Table III and Fig. 1. Inspection of this data suggests highly significant differences between some of the pairs of group means, particularly situation 2 compared with all other situations, and situation 1 compared with situations 4 and 6. The t values presented in Table V confirm this. The dichotomy noted between situations 1, 2, 3 and situations 4, 5, 6 on correlation-coefficients, is emphasized by the results for range and mean number of noun phrases, as presented in Table III and Fig. 1. The extended range covered by the scores for situations 4, 5, 6, in contrast to the limited range of scores for situations 1, 2, 3, is clearly illustrated in Fig. 1.

Number of verb phrases. Table VI presents the correlational data for the number of verb phrases produced. Correlations for number of verb phrases generally indicated a more definite relationship than did the correlations for the number of noun phrases produced. Low positive correlations were obtained from situations 1-2, 2-3, 3-6, 2-C₂, 6-C₁, and 6-C₂, and a marked relationship was established between situations 1-6 (0.72) and situations 4-5 (0.78). The moderate and high correlations were all statistically significant beyond either the .05 or .01 levels.

In general, the dichotomy between situations 1, 2, 3 and situations 4, 5, 6, noted in the results for number of noun phrases, was repeated in this measure. An exception to this pattern was situation 6 which, in situations 3-6, 6-C₁, and 6-C₂, showed a low but definite relationship, and in situations 1-6 a high and

TABLE V

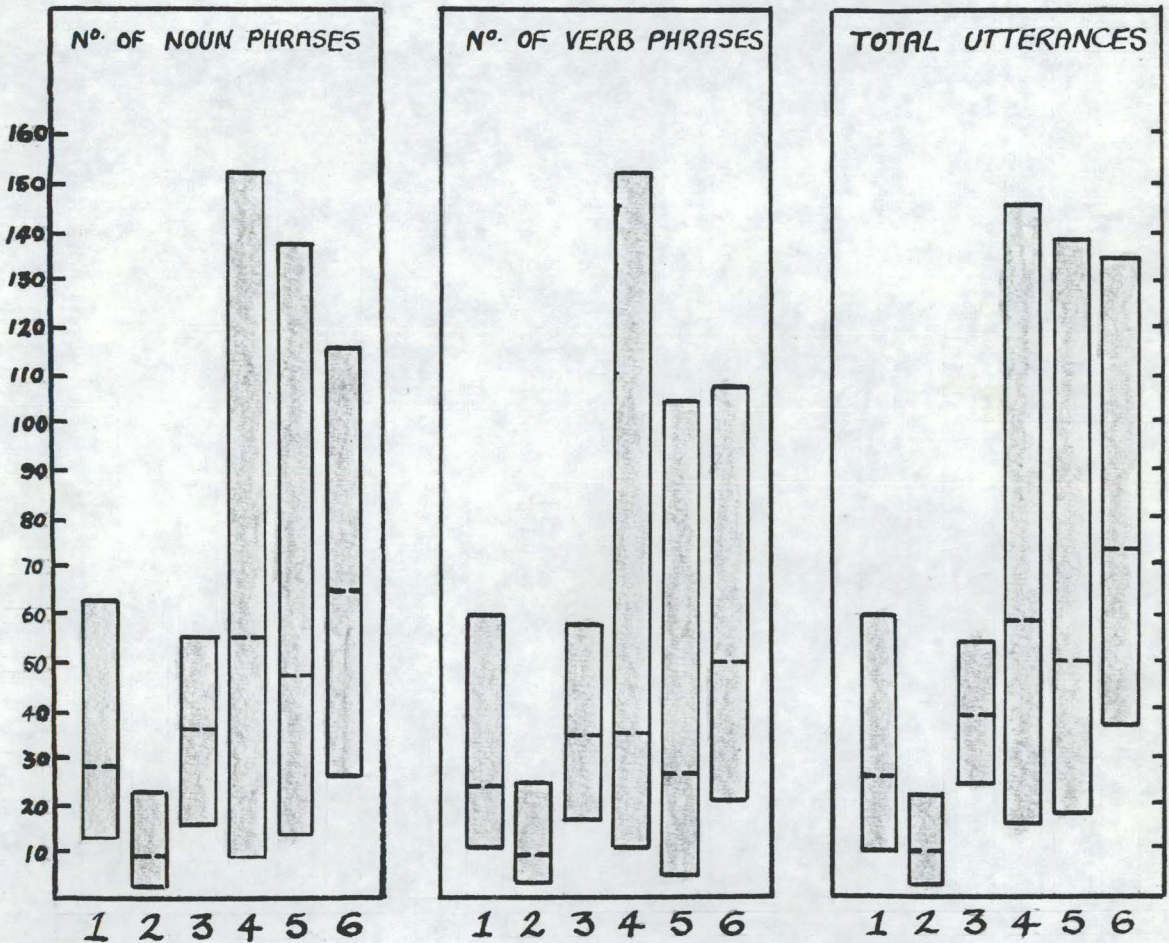
t TEST VALUES BY SITUATION
FOR NUMBER OF NOUN PHRASES

Situation	1	2	3	4	5
2	6.203***				
3	2.587*	11.716***			
4	3.094**	5.888***	2.184*		
5	2.538*	5.405***	1.494	1.195	
6	6.183***	10.007***	5.082***	1.59	2.646*

* p < .05 level
** p < .01 level
*** p < .001 level

FIG. 1

BAR GRAPH SHOWING DISTRIBUTION OF RANGE AND MEAN SCORES BY SITUATIONS FOR THREE QUANTITATIVE MEASURES (NUMBER OF NOUN PHRASES, NUMBER OF VERB PHRASES, TOTAL UTTERANCES)



Notes

- 1 The top and bottom of the bars represent the range of scores for that situation, and the dotted line represents the group mean for the situation.
- 2 The numbers along the bottom axis represent the six situations.

TABLE VI

CORRELATION-COEFFICIENTS BY SITUATION
AND CONDITION FOR
NUMBER OF VERB PHRASES

Situation	1	2	3	4	5	6	C ₁	C ₂
2	0.29							
3	0.44*	0.23						
4	-0.02	-0.28	0.08					
5	0.19	0.08	0.15	0.78**				
6	0.72**	-0.10	0.20	0.48*	0.62**			
C ₁			0.45*	-0.11	0.19	0.20		
C ₂	0.44*	0.23		0.08	0.15	0.20	0.45*	
C ₃	0.16	-0.14	0.16				0.09	0.16

* p < .05 level
** p < .01 level

significant correlation was obtained ($p < .01$).

A low negative correlation (-0.28) between situations 2-4 repeated a similar negative correlation for these same two situations on the number of noun phrases measure. A t test indicated that the difference between the group means for these two situations was significant beyond the .01 level.

As with the number of noun phrases, the most marked relationships were obtained from the paired combinations of situations 4, 5, and 6. The results in Table VI indicate that the correlations for situations 4-5 and 5-6 were significant beyond the .01 level, while the correlation for situations 4-6 was significant beyond the .05 level.

An analysis of variance (Table VII) indicated that the over-all variation of the means for the six different situations was highly significant. As the data in Table VIII indicates, the statistical significance of the t values, from a series of t tests computed for the number of verb phrases, is not generally as high as was the case for number of noun phrases. The main feature of the t values presented in Table VIII is the significance of the difference between the group means of the various pairs of situations 1, 2, 3.

The data presented in Table III and represented in Fig. 1 also includes the range and mean number of verb phrases by situations. Although the dichotomy noted in the results for number of noun phrases is repeated for number of verb phrases, the differences between group means, in the latter measure, are not as marked. The levels of significance for data in Table V and Table VIII support this conclusion. The group mean for situation 2, however, again

TABLE VII

A COMPLEX ANALYSIS OF VARIANCE
OF NUMBER OF VERB PHRASES OF TWENTY SUBJECTS
FROM SIX DIFFERENT ORAL LANGUAGE SITUATIONS

Source of Variation	Sum of Squares	df	Variance Estimate	F
Situations	19623.925	5	3924.785	11.4225***
Subjects	20454.492	19	1076.552	
Remainder	32641.908	95	343.599	
Total	72720.325	119		

*** $p < .001$ level

TABLE VIII

t TEST VALUES BY SITUATION
FOR NUMBER OF VERB PHRASES

Situation	1	2	3	4	5
2	4.963***				
3	3.603**	9.779***			
4	1.433	3.737**	0.014		
5	0.496	3.308**	1.494	1.855	
6	6.175***	6.907***	2.655*	2.372*	4.902***

* p < .05 level
** p < .01 level
*** p < .001 level

appears in marked contrast to the group means for all other situations, and the t values, presented in Table VIII, for situation 2 pairings were all beyond either the .01 or .001 levels of significance.

The pattern of distribution of scores, noted on the measures of noun phrases (Table III, Fig. 1), was repeated for the number of verb phrases. The first three situations produced a restricted distribution of number of verb phrases in contrast to the latter three situations. The effect of extreme scores is much more noticeable at the upper end of the distribution for all situations, and for situation 4 in particular.

A series of t tests was also computed comparing mean number of noun phrases and mean number of verb phrases by situations. Table IX shows group means and t values for these comparisons. The differences between noun phrase and verb phrase group means for situations 4, 5, and 6 were highly significant ($p < .001$). This was in contrast to differences between the group means for situations 2 and 3, which did not reach an acceptable level of significance.

Total utterances. The correlation-coefficients presented in Table X generally indicate either negligible relationships or small relationships. Moderate correlations, however, were obtained from situations 4-5 (0.70), 4-6 (0.61), and 5-6 (0.53).

The dichotomy noted between situations 1, 2, 3 and situations 4, 5, 6 for both noun phrase and verb phrase measures was repeated in this measure. The relationship was stronger between the comparisons in the 4-5-6 grouping, with the correlations between situations 4-5 and 4-6 significant beyond the .01 level and that

TABLE IX

GROUP MEANS AND t VALUES
FOR NOUN PHRASES AND
VERB PHRASES

Situation	Mean No. NP's	Mean No. VP's	t
1	28.1	24.0	2.6076*
2	9.15	9.3	0.247
3	36.8	34.95	2.0672
4	55.2	35.05	5.9701***
5	47.9	26.75	6.6027***
6	65.8	51.15	5.5446***

* p < .05 level
*** p < .001 level

TABLE X

CORRELATION-COEFFICIENTS BY SITUATION
AND CONDITION FOR
TOTAL UTTERANCES

Situation	1	2	3	4	5	6	C ₁	C ₂
2	0.39							
3	0.37	0.26						
4	0.02	-0.18	-0.10					
5	0.09	0.27	0.21	0.70**				
6	-0.03	0.15	-0.05	0.61**	0.53*			
C ₁			0.39	-0.04	0.16	0.03		
C ₂	0.37	0.26		-0.10	0.21	-0.05	0.39	
C ₃	0.06	0.09	0.06				0.08	0.06

* p < .05 level
** p < .01 level

between situations 5-6 at the .05 level. Situation 5, in combination with situations 2 and 3 and condition 2, did establish a link across the two groupings referred to above. These correlations however, were of low magnitude and did not reach a level of statistical significance.

An analysis of variance was also computed, to test the significance of the over-all variation of the means for the six different situations, and the results of this analysis are presented in Table XI. An extremely high F value of 25.4381 was very significant ($p < .001$), and a series of t tests was computed to determine which group means were contributing to this difference.

Most of the t values obtained from comparing group means on the total utterances measure were statistically significant, and the majority of these were so beyond the .001 level. The only pairs of situations with t values that were not statistically significant were situations 3-5 and 4-5. These t values and their levels of significance are presented in Table XII. All the situation 1 and situation 2 pairings produced t values significant beyond the .001 level, except for situations 1-5 which was significant beyond the .01 level.

The comparative data presented in Table III and Fig. 1 indicates that the pattern, noted in the results for number of noun phrases and number of verb phrases, is again repeated in the measure of total utterances. The effect of extreme scores, however, is much less noticeable in the measure of total utterances than in either of the other two quantitative measures. The effect of extreme scores was again more noticeable at the upper end of the distribution, although not as marked as was the case with the number of verb phrases.

TABLE XI

A COMPLEX ANALYSIS OF VARIANCE
OF TOTAL UTTERANCES OF TWENTY SUBJECTS
FROM SIX DIFFERENT ORAL LANGUAGE SITUATIONS

Source of Variation	Sum of Squares	df	Variance Estimate	F
Situations	54934.3667	5	10986.8733	25.4381***
Subjects	24115.3333	19	1269.228	
Remainder	41030.9667	95	431.9049	
Total	120080.6667	119		

*** p .001 level

TABLE XII

t TEST VALUES BY SITUATION
FOR TOTAL UTTERANCES

Situation	1	2	3	4	5
2	6.06***				
3	4.613***	16.354***			
4	3.915***	6.378***	2.483*		
5	3.32**	5.874***	1.74	1.16	
6	7.538***	11.316***	5.94***	2.571*	3.506**

* $p < .05$ level
** $p < .01$ level
*** $p < .001$ level

Summary. The phenomenon that characterizes the results of the three quantitative measures is the dichotomy between situations 1, 2, 3 and situations 4, 5, 6. The data, particularly in Table III and Fig. 1, illustrates this phenomenon very clearly. Although the tendency towards statistical significance is evident in the various pairings of situations 1, 2, 3 on the three measures, in one case only does this reach statistical significance.¹ In contrast, a strong and significant relationship is established between the various pairings of situations 4, 5, 6 on the three measures. The dichotomy between situations 1, 2, 3 and situations 4, 5, 6, on the three quantitative measures, is emphasized by the links between the two groups. The data in Tables II, VI, and X shows that the correlations between combinations of pairs of situations that linked the two groups, for example situations 1-5, are almost invariably of a very low order. The results also indicate quite clearly that, as far as the three quantitative measures are concerned, the six situations do not produce comparable language samples.

Discussion

The discussion below is concerned primarily with exploring the dichotomy revealed in the results of this study, by examining possible reasons for the occurrence of this phenomenon. The causes can probably be attributed to the influence of two sets of factors: the nature of the situations themselves and the person effect in the administering of the situations.

The nature of the situations. The discussion of this set of factors makes specific reference to the stimulus potential of the situations, to the notion of productivity, and to the factor of

1 See Table VI situations 1-3 for number of verb phrases ($p < .05$).

time in the sampling procedures.

The nature of the situation could very well have contributed to the differences noted between the situations in the results for the three quantitative measures. Smith (1935), in her study of factors influencing the development of language in pre-school children, collected language samples from the child in play with other children and from the child in the home. Her results indicated that for five-year-old children there were differences between the situations, for such language characteristics as number of words to the sentence, complexity of sentences used, and percentage of questions asked.

Each of the situations in the present study was selected because it appeared to represent a different way of eliciting an oral language sample. To some extent this selection was supported in both individual and group differences in the number of phrases or sentences elicited for individual situations (Table III). However, more pronounced than the differences between individual situations was the division of these six situations into two clear groups. These two groups were clearly distinguishable from the correlations in Tables II, VI, and X and from the diagrammatic representation in Fig. 1. There appeared to be greater similarity between the tasks involved in situations 4, 5, 6 than those in situations 1, 2, 3.

It may even be, however, that where a number of stimuli of a similar nature are used, marked variations in the amount of language elicited can occur. Findings from studies by Cowan et al. (1967) and Hawkins (1969) provide support for such a view. Both studies were reported in some detail in the review of the literature. Cowan et al. found significant differences in MLR between the ten stimulus pictures used in their study. Hawkins (1969) also used stimulus

pictures in his study and found that the language elicited by the two series of pictures did differ in certain respects. As far as the production of anaphoric pronouns, for example, was concerned, the narrative series elicited over twice as many as did the descriptive series.

If similar stimulus pictures can produce different results that are statistically significant, then different stimulus situations are perhaps more likely to do this. In the present study, situations 1, 2, 3 represented three quite different situations, and in terms of the production of phrases and sentences these three situations showed only a moderate degree of relationship. On the other hand, a high degree of relationship was established between situations 4, 5, 6. As has already been suggested above, these situations were probably more alike than situations 1, 2, 3. They were much more alike in the language demands they placed on the children, and the three situations all involved interaction with the mother.

It is possible that if the situations in the present study had varied more markedly in nature, the quantitative differences between the language samples would have been even more accentuated. Cazden (1967), for example, collected speech samples in eight quite different situations from two Grade I children. Cazden used terminal units in the analysis of the samples. The two children differed quite markedly in the total number of terminal units produced, in the number of terminal units averaged per situation, and in which situations were the most or least productive for each child.¹

Productivity for language is likely to be closely related to

¹ One child averaged 458 terminal units to the other's 315 terminal units. The number of terminal units for the situations ranged from 21-129 for one of the children and from 12-77 for the other child.

the stimulus potential of any situation. The quantitative measures in the present study were concerned with the production of noun or verb phrases and of sentences. The data clearly indicated that situations 4, 5, 6 were much more productive than situations 1, 2, 3 on all three measures. Related to language productivity, in the present study, was the range of individual scores for each of the measures in the different situations. Fig. 1 plainly indicated the pattern of scores across the three measures. The tendency was clearly for situations 4, 5, 6 to have a more extended range of scores than situations 1, 2, 3. Situation 2, in particular, was very restricted on all three measures. Thus, from the point of view of productivity, the only finding that can be supported with any certainty is that situation 2 was most unsuitable, and as the data in Table III indicated all the subjects experienced great difficulty in producing sentences in this situation. The disparity in productivity between the situations has implications for the reliability of the language sample elicited.

The sample number of 50 responses arises frequently in the literature on children's language (Shriner & Sherman, 1967; Baldwin & Frank, 1969; Lee & Canter, 1971). If 50 responses is the minimum number likely to provide a representative sample of a child's oral language then this may account for the marked differences between situations 1, 2, 3 and situations 4, 5, 6 in the present study. As the data in Table III indicated, situations 4 and 6 each elicited a mean of 50 or more noun phrases or total utterances. Situations 4, 5, 6 were less productive for mean number of verb phrases. Situations 1, 2, 3 were generally poor at eliciting phrases and sentences, and even the most productive situation (situation 3) produced a mean number of phrases or utterances considerably less than the 50 responses

the literature takes as an acceptable minimum.

Darley & Moll (1960) sought to determine whether equally reliable information on children's language could be obtained from the analysis of fewer than 50 responses. The results of their reliability analysis suggested that a sample of 50 responses was probably adequate for a measure such as mean length of response (MLR) but for a qualitative measure, such as the structure complexity score (SCS), a sample of at least 100 responses would probably be required.

On the basis of this data, it would seem that situations 1, 2, 3, produced an inadequate sample for analysis. However, unlike the majority of studies reviewed by the investigator, which sum the responses from a number of stimulus situations to produce a total of at least 50 responses, the present study has treated the responses from different eliciting situations as separate samples for analysis. If the present study had summed the responses from the different situations to produce a total sample, then the mean number of noun phrases, verb phrases, and total utterances would have been 242.45, 181.05, and 250 respectively. Such samples are far in excess of the number of responses needed, according to Darley & Moll, to give a reliable sample for any quantitative or qualitative measure.

The effect of the averaging process, in summing a number of samples of language elicited in different situations to obtain a total sample, may be to obscure important contours in actual language performance. If the totals above had simply been stated as averages per situation, without consideration for the actual number of phrases or sentences elicited in each situation, the figures would have been 40.4, 30.1, and 43.1 respectively. If these figures are compared

with the mean scores presented in Table III, then it can be seen that, not only would the character of individual situations be lost, but also the need to examine the reasons for such differences would not arise.

Another factor contributing to the differences noted between situations may have been the sampling techniques used. The main criterion was to obtain a maximum sample of oral language. McCarthy (1929) used a method of equal samplings to obtain her corpus of responses, and this technique has been repeated frequently since then. Equal samplings does seem to have the advantage of working with the same number of sentences from each subject. The major disadvantages would seem to lie in the collection of this corpus of x sentences. If a set number of situations or stimulus items are to be used, the possibility arises that the required corpus may be produced without sampling all of the situations or stimuli provided. Thus, the total sample could comprise an unbalanced weighting of language elicited under different conditions. Since varying the order of presentation of stimulus situations does not appear to be a widely practised procedure in research on children's language, the representativeness of language elicited following the technique of equal samplings seems questionable. Where the child is allowed to exhaust the oral language possibilities of any single situation or stimulus without the constraints of time or quantity, his production is more likely to be typical of his normal language performance.

It was mentioned above that the criterion used to determine the size of the language sample was to elicit as much language as possible in any situation. No attempt was made to control the time allocated to any one situation and, therefore, the marked differences between

situations 1, 2, 3 and situations 4, 5, 6, in the number of phrases or sentences elicited, may simply have been a result of differences in time taken to complete each situation. The effect of a disproportionate number of phrases and sentences on the primary qualitative measures will be discussed in the next chapter. However, McCarthy (1929) noted, in her study of children's language in different situations, that time was a factor in certain situations. She found a negative correlation between length of response and time required to collect 50 responses in her playground situation.

The person effect. Most of the discussion related to the results for the quantitative measures has concentrated on factors related to the inanimate aspects of the language situations. This is not to deny the importance of the personal factor, for without a person to direct one's oral or written language to the whole purpose of this form of communication would be meaningless. The discussion below considers, albeit briefly, factors related to the person effect that may have had some influence upon the results obtained in the present study.

A central figure in research on children's language is the researcher, and according to Cowan et al. (1967) the possibility of researcher effect on the results in studies of children's language has not received the attention it should have. The dichotomy between situations 1, 2, 3 and situations 4, 5, 6 on production of phrases and sentences in the present study could lend credence to the view that a person effect was exerting some influence. The dichotomy parallels the involvement of the two adults in the data-collection phase. Situations 1, 2, 3 involved the investigator, in either an administrative or participant role, while situations 4, 5,

6 involved the mother in interaction with her child. The investigator was involved in discussion with children in situation 3, and this type of interaction was the closest approximation to the interaction that occurred in situations 4, 5, 6. As the data in Table III indicated, the number of phrases and sentences produced in this situation more closely approximated the same results for situations 4, 5, 6 than did situations 1 and 2. To what extent the differences were real differences, reflecting the influence of the person interacting with the children, is very much a matter for conjecture at this stage.

The other person who figures prominently in research on children's language is the mother. Although records of time taken to complete the various tasks were not kept as part of the experimental procedure, the length of the typescripts for situations 4, 5, 6 indicated that the children were much more productive, in terms of number of utterances elicited, when interacting with their mothers. However, there were some quite marked individual differences, particularly in the production of noun and verb phrases, where a quarter of the children were more productive in situations 1, 2, 3 than in situations 4, 5, 6. The general difference between the productivity of situations 1, 2, 3 and situations 4, 5, 6 may simply have indicated that the mothers were more persistent than the investigator, and that the quantity produced does not reflect any basic differences in the complexity of the language produced. This aspect will be explored further in the next chapter.

Personal factors may also have contributed to the differences noted in the results. Siegman & Pope (1966) have considered the relationship between interviewee anxiety and speech. They discussed

optimum arousal theory with reference to the facilitating and inhibiting effects of anxiety. The inhibiting effect of anxiety may well have contributed to the poor productive potential in situation 2, and this possibility gained some support from subjects' comments.

Summary. The discussion above has attempted to consider some of the factors that may have influenced the dichotomy between situations that was the marked characteristic of the results presented in this chapter. It was suggested that this dichotomy could have been influenced by such factors as the stimulus potential of the situations, the time factor, the effect of verbal engagement with such persons as the investigator and the mothers, and personal factors such as anxiety. Although these various factors have been discussed as separate issues, this should not be taken to imply that any one factor is more important than any other factor, or that the factors exert an influence in isolation from each other.

CHAPTER IV

QUALITATIVE MEASURES: RESULTS AND DISCUSSION

This chapter is concerned with:

- 1) the results of the three qualitative measures,
- 2) discussion of the results for the three qualitative measures.

Results

This section presents the results for:

- i) noun phrase index (NPI),
- ii) verb phrase index (VPI),
- iii) length complexity index (LCI).

Noun phrase index (NPI). The major feature of the correlations presented in Table XIII is the low degree of relationship established between the various pairs of situations and/or conditions. The only correlation that was statistically significant ($p < .01$) was a moderate correlation between situations 5-6 (0.57). Most of the low negative or positive correlations obtained ranged between 0.25 and 0.33.

The correlations between the pairs of situations for NPI was also characterized by the number of negative correlations obtained. Low negative correlations were obtained for pairs 2-3 (-0.33), 2-C₂ (-0.33), 1-3 (-0.26), 1-C₂ (-0.26), 3-C₁ (-0.26), and C₁-C₂ (-0.26). An examination of the data suggests a tendency for subjects who had a relatively high NPI in one of the situations, to have a low NPI in the other situation. This inverse relationship, however, though discernible, was not sufficiently strong enough to indicate a significant trend.

TABLE XIII

CORRELATION-COEFFICIENTS BY SITUATION
AND CONDITION FOR
NOUN PHRASE INDEX

Situation	1	2	3	4	5	6	C ₁	C ₂
2	0.02							
3	-0.26	-0.33						
4	-0.06	-0.05	0.17					
5	0.16	0.26	0.10	0.27				
6	0.31	0.09	-0.01	0.27	0.57**			
C ₁			-0.26	-0.11	0.25	0.39		
C ₂	-0.26	-0.33		0.17	0.10	-0.01	-0.26	
C ₃	0.19	0.15	0.07				0.28	0.07

** p < .01 level

The dichotomy, noted in the results for the quantitative measures, between situations 1, 2, 3 and 4, 5, 6 was not evident in the correlations for NPI. The correlations obtained between situations within the two major groups, identified in the previous chapter, were generally no greater than those obtained for situations paired across these groups.

An analysis of variance (Table XIV) indicated that the over-all variation of the means for the six different situations on NPI was highly significant ($F=22.55, p<.001$). Since the analysis of variance produced an F value that was highly significant, a series of t tests was computed for the various pairs of situations to identify which of the group means were contributing to this significant difference.

The main feature of the t values presented in Table XV is that almost half of them (46.6 per cent) were large enough to be highly significant ($p<.001$). With the exception of one other t value, the remaining t values were not sufficiently large to reach an acceptable level of significance. The main feature of the significant t values in this table are those obtained between all pairings with situation 1, and the pairings of situation 4 with situations 1, 5, and 6. The group mean differences between situation 1 and all other situations, and between situation 4 and situations 1, 5, and 6 are clearly illustrated in Fig. 2.

Range and mean NPI for the six situations are included in the data presented in Table XVI and in Fig. 2. Generally, situations 4, 5, 6 were much more restricted in the range of NPI than were situations 1, 2, 3. This was in marked contrast to the range for the number of noun phrases for these same situations (Table XVI).

TABLE XIV

A COMPLEX ANALYSIS OF VARIANCE
OF NOUN PHRASE INDICES OF TWENTY SUBJECTS
FROM SIX DIFFERENT ORAL LANGUAGE SITUATIONS

Source of Variation	Sum of Squares	df	Variance Estimate	F
Situations	9.021	5	1.804	22.55***
Subjects	1.791	19	0.094	
Remainder	7.568	95	0.08	
Total	18.38	119		

*** $p < .001$ level

TABLE XV

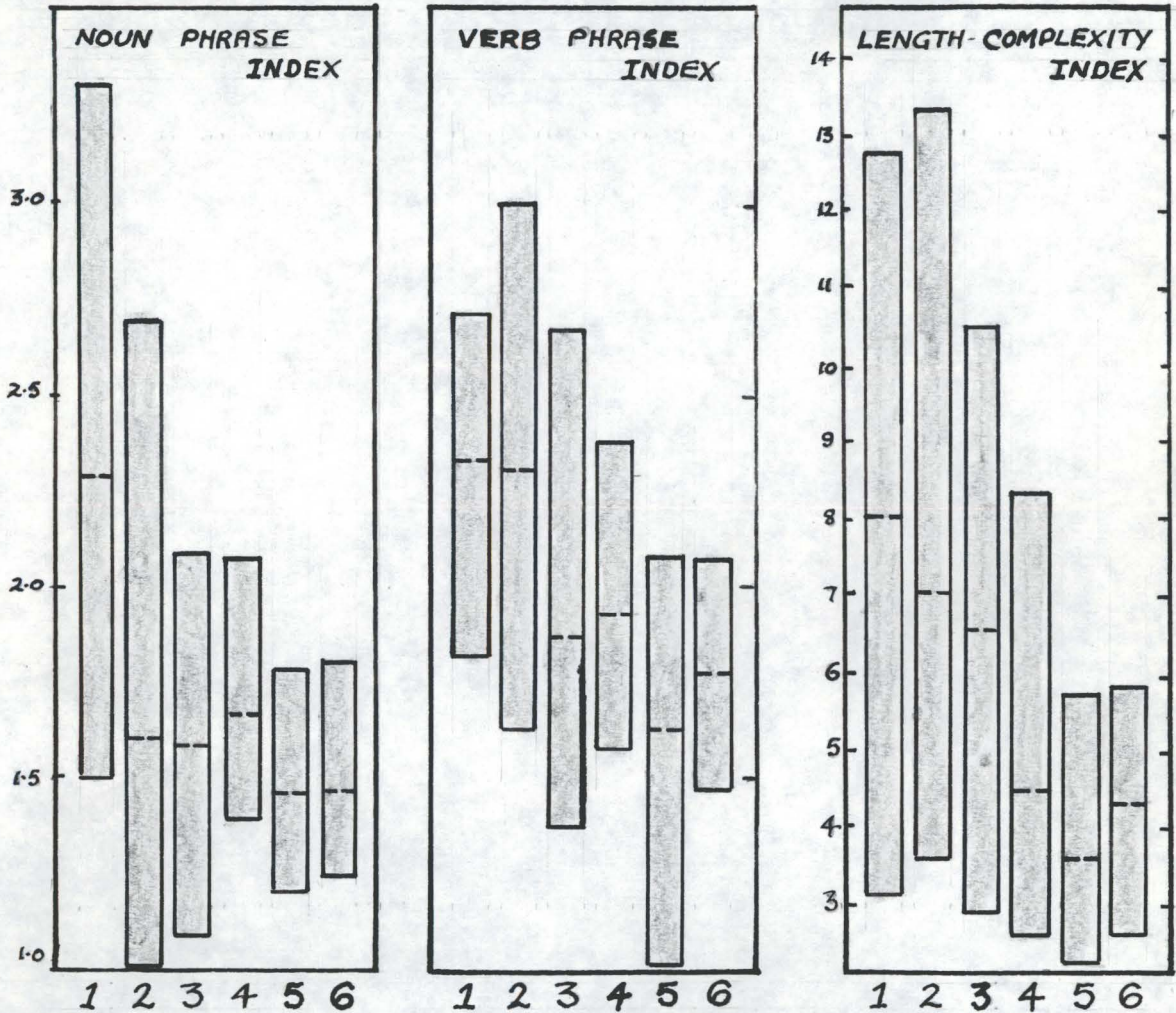
t TEST VALUES BY SITUATION
FOR NOUN PHRASE INDEX

Situation	1	2	3	4	5
2	5.199***				
3	7.771***	0.082			
4	5.805***	0.913	1.283		
5	8.288***	1.578	2.161*	4.35***	
6	8.742***	1.527	2.078	4.306***	0.202

* $p < .05$ level
*** $p < .001$ level

FIG. 2

BAR GRAPH SHOWING DISTRIBUTION OF RANGE AND MEAN SCORES BY SITUATIONS FOR THREE QUALITATIVE MEASURES (NOUN PHRASE INDEX, VERB PHRASE INDEX, LENGTH COMPLEXITY INDEX).



Notes

- 1 The top and bottom of the bars represent the range of scores for that task and the dotted line represents the group mean for the situation.
- 2 The marked difference in range between NPI and VPI situations and LCI situations called for different scales to show the relative relationship between the three groups of situations.
- 3 The numbers represent the six situations.

TABLE XVI

RANGE AND MEAN NOUN PHRASE INDEX,
 VERB PHRASE INDEX, AND LENGTH COMPLEXITY INDEX
 BY SITUATIONS FOR TOTAL GROUP

Situation	Noun Phrase Index		Verb Phrase Index		Length Complexity Index	
	Range	Mean	Range	Mean	Range	Mean
1	1.5 -3.32	2.27	1.83-2.71	2.34	2.86-12.57	7.98
2	1.0 -2.69	1.6	1.63-3.0	2.31	3.3 -13.17	6.97
3	1.07-2.07	1.59	1.37-2.68	1.86	2.74-10.33	6.43
4	1.4 -2.1	1.67	1.57-2.36	1.89	2.39- 8.24	4.27
5	1.22-1.79	1.47	1.0 -2.08	1.65	1.96- 5.68	3.47
6	1.24-1.80	1.46	1.48-2.06	1.78	2.49- 5.74	4.23

Apart from mean NPI for situation 1, the mean NPI's for the other five situations were similar, and, as the data on Table XV indicates, most of these differences were not statistically significant.

Although the correlation-coefficients for NPI did not reveal the dichotomy noted in the results for the quantitative measures, a tendency in this direction is apparent from the data in Fig. 2 and Table XVI. However, this tendency was noticeable only in the range of NPI's. The mean NPI's, as indicated above, were generally very similar.

Verb phrase index (VPI). The pattern revealed by the correlations in Table XVII does not suggest the existence of any strong relationships between pairs of situations and/or conditions. Most of the correlations indicated only a very small relationship between the situations paired. Pairings including situations 3, 5, and 6 were prominent in the positive or negative correlations between 0.20 and 0.40. The moderate positive correlation for situations 2-3 (0.48) was statistically significant ($p < .05$).

Again, correlations between pairs within the situations 1, 2, 3 and within situations 4, 5, 6 were generally not higher than correlations between pairs across these two major groups, as identified by the three quantitative measures.

A feature of the correlational matrix was the small group of negative correlations that ranged from -0.12 to -0.44, with the latter beyond the .05 level of statistical significance. The negative correlation for situations 4-5 suggested a substantial inverse relationship between these two situations. This inverse relationship indicated a more significant trend than that noted for

TABLE XVII

CORRELATION-COEFFICIENTS BY SITUATION
AND CONDITION FOR
VERB PHRASE INDEX

Situation	1	2	3	4	5	6	C ₁	C ₂
2	0.13							
3	0.05	0.48*						
4	0.00	0.19	0.13					
5	0.24	0.17	0.23	-0.44*				
6	-0.37	0.08	0.26	0.00	0.26			
C ₁			0.33	0.10	0.27	-0.30		
C ₂	0.05	0.48*		0.13	0.23	0.26	0.33	
C ₃	-0.27	0.23	0.31				-0.12	0.31

* p < .05 level

situations 2-3 for NPI.

An analysis of variance was computed to test the significance of the over-all variation of the means for the six situations, and Table XVIII presents the results of this analysis. Since the analysis of variance produced an F value that was highly significant, a series of t tests was computed for the various pairs of situations.

The t test values and levels of significance for VPI are presented in Table XIX. The high statistical significance of the pairings of situation 1 with all other situations (except situation 2) and of situation 2 with all other situations (except situation 1) was the major feature of the t values for VPI. These significant differences are particularly noticeable in Fig. 2. The other feature of the t values in Table XIX was the lack of significant differences between the group means of the various pairings of situations 3, 4, and 6. Again, this is evident from a visual inspection of the data in Fig. 2.

The differences between the group means, as represented by the t values, were generally greater for pairs of situations across the two major groups of situations than for pairs of situations within the groups. To some extent this re-introduces the dichotomy noted in all of the quantitative measures yet lacking in the correlation patterns for NPI and VPI. For VPI this tendency was noticeable not only in the range of scores (as was the case for NPI), but also in the group means for the situations. The data from Table XVI and Fig. 2 indicates that the range of VPI was generally more restricted in situations 4, 5, 6 than in situations 1, 2, 3. This was in marked contrast to the relationship noted between the groups of situations for range of number of verb phrases (Table III, Fig. 1).

TABLE XVIII

A COMPLEX ANALYSIS OF VARIANCE
OF VERB PHRASE INDICES OF TWENTY SUBJECTS
FROM SIX DIFFERENT ORAL LANGUAGE SITUATIONS

Source of Variation	Sum of Squares	df	Variance Estimate	F
Situations	8.1452	5	1.629	25.857***
Subjects	2.1968	19	0.116	
Remainder	6.0214	95	0.063	
Total	16.3634	119		

*** p < .001 level

TABLE XIX

t TEST VALUES BY SITUATION
FOR VERB PHRASE INDEX

Situation	1	2	3	4	5
2	0.316				
3	6.12***	5.693***			
4	6.241***	4.555***	0.374		
5	10.534***	6.965***	2.954**	4.258***	
6	11.286***	5.773***	1.218	1.717	2.478*

* p < .05 level
** p < .01 level
*** p < .001 level

Table XX presents the results of a series of *t* tests computed on NPI and VPI by situations. The differences for three of the six comparisons were statistically significant beyond the .001 level, and for two other comparisons beyond the .01 level. Although the results show that the verb phrases were generally more complex than the noun phrases in each situation, inspection of the data in Table XX indicates a tendency for a linear relationship to be established between NPI and VPI by situations.

Length complexity index (LCI). The correlations presented in Table XXI generally indicate more substantial relationships than was the case for either NPI or VPI. Most significant of the moderate correlations were those for situations 2-3 (0.68) and 2-C₂ (0.68) which were significant beyond the .01 level, and those for 3-C₃ (0.47), 4-6 (0.48), and C₂-C₃ (0.47) which were significant beyond the .05 level. High correlations, suggesting a marked relationship, were obtained from situations 1-2 (0.72), 1-3 (0.74), 5-6 (0.83), 1-C₂ (0.74), 3-C₁ (0.76), C₁-C₂ (0.76). All of these correlations were beyond the .01 level of statistical significance. The very strong relationship between situations 5 and 6 is clearly discernible in Fig. 3.

The dichotomy between situations 1, 2, 3 and situations 4, 5, 6 re-appeared in this measure as a major feature of the pattern of correlations. Although there was a tendency for situations producing low and moderate correlations to link these groups, the separateness of the two major groups was more marked. The high correlations for pairs of situations within the 1, 2, 3 grouping was another feature of Table XXI.

An analysis of variance (Table XXII) indicated that the variation

TABLE XX

GROUP MEANS AND *t* VALUES
FOR NOUN PHRASE INDEX AND
VERB PHRASE INDEX

Situation	Mean VPI	Mean NPI	<i>t</i>
1	2.336	2.265	0.6679
2	2.306	1.599	5.8916***
3	1.858	1.592	4.8628***
4	1.886	1.67	3.823**
5	1.645	1.466	3.2723**
6	1.783	1.459	8.372***

** $p < .01$ level
*** $p < .001$ level

TABLE XXI

CORRELATION-COEFFICIENTS BY SITUATION
AND CONDITION FOR
LENGTH COMPLEXITY INDEX

Situation	1	2	3	4	5	6	C ₁	C ₂
2	0.72**							
3	0.74**	0.68**						
4	0.16	0.07	0.39					
5	0.28	0.09	0.41	0.37				
6	0.19	0.10	0.42	0.48*	0.83**			
C ₁			0.76**	0.16	0.22	0.16		
C ₂	0.74**	0.68**		0.39	0.41	0.42	0.76**	
C ₃	0.19	0.07	0.47*				0.15	0.47*

* p < .05 level
** p < .01 level

FIG. 3

RANK ORDER SCATTERGRAM
SHOWING RELATIONSHIP BETWEEN
SUBJECTS' LCI FOR SITUATION 5
AND SITUATION 6

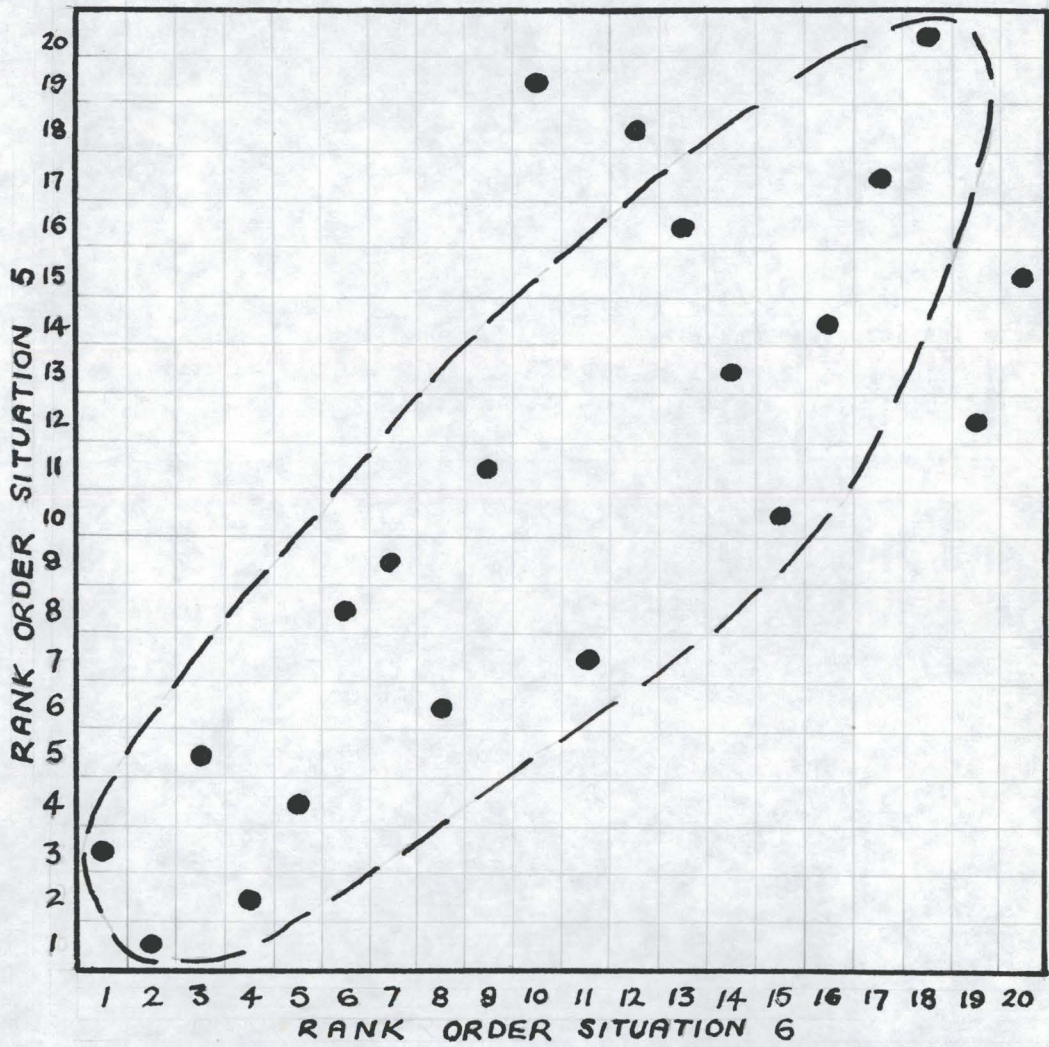


TABLE XXII

A COMPLEX ANALYSIS OF VARIANCE
OF LENGTH COMPLEXITY INDICES OF TWENTY SUBJECTS
FROM SIX DIFFERENT ORAL LANGUAGE SITUATIONS

Source of Variation	Sum of Squares	df	Variance Estimate	F
Situations	328.019	5	65.604	26.755***
Subjects	205.406	19	10.811	
Remainder	232.915	95	2.452	
Total	766.34	119		

*** $p < .001$ level

between the means of the six situations on LCI was highly significant ($F = 26.755, p < .001$). As a consequence of this significant difference, a series of t tests was computed for the various pairs of group means.

Only two of the fifteen t values presented in Table XXIII failed to reach statistical significance beyond the .05 level. The feature of the data presented in this table was the high level of statistical significance between the various group mean pairings. Of the thirteen statistically significant t values, eleven were beyond the .001 level. The data in Table XXIII indicates that differences between the group means for combinations of situations 1, 2, 3 or combinations of situations 4, 5, 6 tended to be of lesser statistical significance than the differences between the group means of combinations across these two major groupings. All such differences were highly significant beyond the .001 level. This pattern of relationships and differences between group means and range of LCI can be seen clearly in Fig. 2 and from the data in Table XVI.

The range of LCI's was much greater in the first three situations than in situations 4, 5, 6. This repeated a tendency noted for NPI and VPI, and was in marked contrast to the pattern noted for total utterances (Table III, Fig. 1). The dichotomy between situations 1, 2, 3 and situations 4, 5, 6 was more clearly discernible in the results for LCI than in the results for either NPI or VPI. However, the tendency towards such a dichotomy in all three measures was evidenced generally by larger group means for situations 1, 2, 3 than for situations 4, 5, 6, and by a more extended range of indices for situations 1, 2, 3 than for situations 4, 5, 6.

TABLE XXIII

t TEST VALUES BY SITUATION
FOR LENGTH COMPLEXITY INDEX

Situation	1	2	3	4	5
2	2.271*				
3	4.204***	1.179			
4	6.377***	3.980***	4.88***		
5	8.502***	5.366***	7.021***	2.457*	
6	6.941***	4.316***	5.313***	0.152	5.217***

* p < .05 level
*** p < .001 level

Summary. The correlations obtained on the three qualitative measures generally indicated only low to moderate relationships between the pairs of situations and/or conditions. It was only on LCI that more substantial relationships were established between certain pairs of situations. The dichotomy between situations 1, 2, 3 and situations 4, 5, 6 was not as clearly discernible on the qualitative measures as it was on the quantitative measures. Although a tendency in this direction was apparent from the range and mean scores for NPI and VPI, it was only on LCI that this phenomenon resulted from all the major statistical procedures. The results indicated that the language samples elicited in the six situations were not comparable on complexity of language, as measured by NPI, VPI, and LCI.

Discussion

The discussion below considers characteristics revealed in the results for the three qualitative measures, and then examines factors that may influence the complexity of language elicited in different situations.

A feature of the correlations for NPI and VPI was the number of low order negative correlations that were obtained. The only significant negative correlation obtained, however, was that for situations 4-5 (-0.44) on VPI ($p < .05$) and even this indicated only a very tenuous inverse relationship. In comparing the pattern of negative correlations for NPI with those for VPI, it was interesting to note that all pairs of situations that produced a negative correlation for one of the measures produced a positive correlation on the other measure.

Unlike the dichotomy noted between groups of situations, that was a major characteristic of the results for the three quantitative measures, this phenomenon was only generally apparent in the results for LCI on the qualitative measures. The correlations between pairs of situations within situations 1, 2, 3 and within situations 4, 5, 6 for NPI and for VPI were not noticeably higher than those for pairings of situations across these groups. When the correlations for LCI, however, were examined (Table XXI) the dichotomy was again a prominent characteristic.

Associated with the general dichotomy between situations 1, 2, 3 and situations 4, 5, 6 on LCI was a tendency for the range of scores to be more restricted for situations 4, 5, 6 on all three qualitative measures (Table XVI, Fig. 2). It is interesting to note that this trend was the reverse of that commented on in the discussion for the quantitative measures, where the restricted range of number of phrases and number of utterances was clearly related to situations 1, 2, 3, (Table III, Fig. 1).

The data in Table XVI shows that the highest mean indices for all three measures were recorded in situation 1, and the lowest mean indices in situation 5 for VPI and LCI and in situation 6 for NPI. If the size of the indices was affected solely by the number of phrases or sentences produced, then the data from Table III (Chapter III) would suggest an inverse relationship between scores on the quantitative measures and those on the qualitative measures. The tendency for such a relationship can be seen in the data in Tables III and XVI. However, in only two instances did an exact inverse relationship hold true.¹ This suggested that some factor, or

1 These instances were situation 6 for NP and NPI and situation 3 for VP and VPI.

factors, other than the number of utterances was influencing the complexity of the language elicited in these different situations.

Support for this comes from an examination of the Tables for t test values on the various measures (Tables V and XV, VIII and XIX, XII and XXIII). The t tests on situations 3-5 for number of noun phrases, situations 1-4, 1-5, 3-5, 4-5 for number of verb phrases, and situations 3-5, 4-5 for total utterances all indicated that the difference between the group means in these instances was not statistically significant. However, when the t test values for these same pairs of situations were examined on the qualitative measures, the differences between the means were all significant beyond, at least, the .05 level. This suggested that, although these situations may not have differed significantly in the number of phrases or utterances produced, there were marked, and significant, differences in the complexity of these same phrases and utterances.

An examination of the differences between the group means on the three qualitative measures did not yield evidence of any recurring pattern, apart from the tendency towards a dichotomy between situations 1, 2, 3 and situations 4, 5, 6 that has already been commented upon. The differences on LCI between the group means within situations 1, 2, 3 and within situations 4, 5, 6 were generally either of no statistical significance or lesser significance than the differences between pairs of situations across these two groups. Situation 1 was prominent on both NPI and VPI, where the difference between its group mean and all other group means was generally highly significant. To a lesser extent, situation 4 (NPI) and situation 2 (VPI) were different from other situations on their respective measures. These tendencies are clearly illustrated in Fig. 2.

Thus, if no consistent pattern was revealed across the three measures, the results of the various statistical procedures did support quite clearly that these language samples, elicited in different situations from the same children, were not comparable on the measures of complexity used in the present study. The factors involved in this raise another set of issues.

Dickie & Bagur (1972), in an excellent article, discussed a number of variables which may affect the language of low-income minority group children. Among the variables they considered were such factors as familiarity of the setting, familiarity with other people in the setting, and variables associated with stimulus materials. These variables seem to offer a frame of reference pertinent to further discussion of the results on the three qualitative measures.

The possible influence that different types of situation may exert on language elicited in those situations has also been considered in the previous chapter. Since LCI gave a measure that combined both length and structural complexity, the differences between situations were of especial importance. As the results in Table XXIII indicated, except for situations 2-3 and 4-6, the difference between group means of all other combinations for LCI were significant beyond either the .05 or .001 levels. These differences, considered in relation to the pattern of correlations obtained (Table XXI), suggested that generally the complexity of the language elicited in the different situations varied quite considerably. The data in Tables XV and XIX indicated that the differences between situations in LCI was reflected also in the other two qualitative measures. Such a finding is not novel. Smith (1935), for example,

in her study of the development of sentences in children, found that the language elicited in the play situation and in the home situation differed in sentence length, in percentage of questions asked, and in negative, imperative, compound, and complex sentences used.

The differences found between situations in the present study may also be due to the influence of the persons involved in the communication situation. Although differences have been noted between all situations in the present study, the dichotomy between situations 1, 2, 3 and situations 4, 5, 6 has also been discussed at length in the previous chapter. This dichotomy, it was noted, coincided with the different involvement of the two adults in the study.

In the situations involving adults it might be expected that the investigator, using an established repertoire of questions (situation 3), might not simplify his language to the same extent as mothers who were under no restraints at all (situations 4, 5, 6). Granowsky & Krossner (1970) investigated the differences between the speech adults use to each other and the speech they use when interacting with children, and found that the adults in their study used more simple sentences and fewer compound, complex, compound-complex, and elaborated sentences when interacting with children. Other researchers (Siegman & Pope, 1966; Cazden, 1967; Cowan et al. 1967) have noted that a mother uses simpler language in interaction with her child. Thus, in interaction with the mother, a child may well respond with language which is less complex than the child is able to produce. The results from Table XVI showed the group mean NPI, VPI, and LCI for each of the six situations and suggested that such

a pattern could be established since situation 3 generally had higher mean indices than situations 4, 5, and 6.

Situation 3 involved the investigator discussing a number of topics with pairs of subjects, and the findings discussed above could also be related to findings in a study by Williams & Mattson (1942). They investigated the effect of the number of persons in the social grouping upon the language elicited, and found that a combination of two children and an adult resulted in more talking and more words per sentence than any other size of group in their study. The size of the group also affected the incidence of commands, criticisms, and questions. Although situation 3 was not more productive, in terms of total utterances, length was an important criterion in LCI and would contribute to any differences in complexity of utterances noted. Further, as was discussed in the previous chapter, the factor of productivity could be related to time and since records of time taken were not kept as part of the present study, the possibility that situation 3 was also more productive, as well as producing more complex language than situations 4, 5, 6, cannot be overlooked.

Other possible influences accounting for the differences in complexity of language noted between the situations may relate to the properties of the setting and the stimulus materials. Familiarity was a feature of the influencing variables suggested above by Dickie & Bagur (1972). In the present study, samples of language were elicited in both familiar and unfamiliar settings. In terms of production, the unfamiliar setting (a university audio-visual room) elicited more sentences than the familiar school setting. However, as discussion above has revealed, production of sentences

was inversely related to the complexity of the language elicited. Therefore, although in the more familiar setting (i.e. the school) fewer sentences were elicited, they were, according to LCI, more complex. On the other hand, this relationship may have been influenced more by familiarity with the persons in the setting. In the setting where the children interacted with their mothers, they were certainly more productive in terms of utterances produced, but the situations giving rise to higher mean LCI's were those associated with a relatively unfamiliar person (the investigator). Discussion above suggested why this may have been.

Variables associated with stimulus materials have also been suggested as other factors having a possible influence on the complexity of language elicited in different situations. Discussion has already made mention of the fact that situation 2, in particular, did not seem to be productive in terms of numbers of phrases and sentences produced. In terms of LCI, however, this language was more complex than that produced in most other situations. A restricted number of utterances, of course, may have a biasing effect on the representativeness of that sample of oral language. As Cazden (1968) has said:

If a particular construction does not appear in a certain transcription of the child's speech, is it missing from the child's linguistic competence or only from this sample of his performance?

However, the significance of the values for situations 2-3 in Tables XII and XXIII would suggest that the number of utterances is not the major factor accounting for differences in language complexity between situations.

The importance of the stimulus itself, as a factor influencing differences in the complexity of language from situation to

situation or even within situations, gains support from findings in studies by Baldwin & Frank (1969) and Cazden (1967). Baldwin & Frank noted, in their study of syntactic complexity in mother-child interactions, that differences in syntactic complexity between mother-child pairs might not reflect any basic difference, in the complexity of oral language used, but simply reflect a difference in the effect of the objects played with. And Cazden (1967) has noted in her study quite marked differences between the average length of terminal units elicited in various situations.

All subjects in the present study were engaged in the same stimulus situations, and an examination of the individual record cards does not reveal any marked individual differences between subjects in the situations that tended to produce the most complex language as indicated by LCI. For individual subjects, situations 1 and 2 consistently produced the largest LCI and situations 4 and 5 the smallest. However, the consistency of individual response in one situation rather than another supports the view that the situations were not comparable, at least in their potential to stimulate equally complex language as measured by LCI.

The possibility that the differences found between situations, in the present study, represent inadequate sampling techniques cannot be overlooked, and implicit in much of the discussion in this and the previous chapter is a recognition of methodological factors. Shriner & Sherman (1967) have evaluated the adequacy of sampling by taking three samples from each subject within a 48-hour period. By doing this they suggested that differences from one set of samples to another could hardly be attributed to language development but must be the result of inadequacy of sampling techniques.

They mentioned the possible influence of such factors as time of day, emotional state of the child or the examiners, "practice" effect, or the stimuli employed to elicit the samples. Many of these factors have already been discussed. The investigator deliberately controlled for "practice" effect by varying the order in which situations were presented.

However, the consistency with which either significant differences between group means or low correlations appeared in the results for the three quantitative measures suggested that the situations in the present study did place different demands on the language used by the children. These demands were reflected in differences between the situations in the complexity of the language produced, in terms of NPI, VPI, and LCI.

Summary. The discussion above has considered some of the features revealed in the results for the three qualitative measures. The discussion has also introduced variables, such as familiarity with the setting, familiarity with people in the setting, and various factors related to the stimulus potential of the situation, that have been identified in the literature. These variables have been related to the results obtained in the present study.

CHAPTER V

CONCLUSION AND IMPLICATIONS FOR FUTURE RESEARCH

The results of both the quantitative and qualitative measures suggested that the language samples elicited from the same subjects in different situations were generally not comparable. The discussion presented in the two previous chapters explored possible reasons for these differences. However, suggesting possible reasons that may have accounted for differences found between the language samples does not deny that these differences did occur in the results, and often at a high level of statistical significance.

On the various quantitative and qualitative measures, the correlation-coefficients obtained, between the various combinations of situations and/or conditions, were generally of a low or moderate order. This suggested that although some degree of relationship was established between the various situations, this was not generally high enough to conclude that any one of a number of situations could have, either produced the same number of utterances or, produced language of the same complexity as measured by LCI.

In spite of the dichotomy between situations 1, 2, 3 and situations 4, 5, 6 that characterized the results, particularly on the quantitative measures, the relationship between the situations within these major groups was not generally strong enough to conclude that any one of the three situations would have produced a representative language sample on their own.

The discussion of results, as mentioned above, explored possible reasons for the differences found between situations. Suggesting

possible factors that may help account for quantitative and/or qualitative differences found between the different situations should not be taken to imply that these factors, in themselves, are not an integral part of a language situation.

Oral language would seem to be a response to some stimulus, be it another person speaking, a picture to be spoken about, a situation to be explained, or a thought to be given verbal expression. That is to say, language does not occur in a vacuum. The factors that make any situation a potential stimulus for language production, and the language that results from that stimulation, would seem to be concomitant circumstances. Consideration of one without the other could well lead to the accumulation of a mass of sterile data. In the present study, however, what was difficult to determine with any exactitude, on the data available, was which of a number of factors were exerting an important influence in any single situation.

An examination of the results for both the quantitative and qualitative measures seemed to indicate that the relationship, or lack of relationship, between situations was far from being one simply of productivity and complexity. The relationship between productivity, as measured by number of phrases or utterances, and complexity, as measured by NPI, VPI, or LCI, was neither linear nor inverse. That is, the situation producing the most utterances did not produce the most complex language, nor did the situation producing the least number of utterances produce the largest LCI. Although the results indicated a strong tendency for an inverse relationship to be established between number of utterances and complexity of language, there was no evidence in the results to support a linear relationship. That the results indicated a tendency towards an

inverse relationship between productivity and complexity seemed, in itself, to suggest that factors other than number of utterances were influencing the complexity of the language elicited in different situations.

The discussion of the results on both quantitative and qualitative measures suggested a number of factors that might be involved in a situation, and influence measures of language elicited in that situation. One of the factors discussed in relation to the qualitative measures, was that of familiarity or unfamiliarity with the setting or with the persons involved in the setting. The results certainly indicated that the least complex language was elicited in an unfamiliar setting (a university audio-visual room), and the most complex language in the more familiar school setting.

However, since in the familiar school setting the children interacted with a relatively unfamiliar adult (the investigator), and in the unfamiliar setting they interacted with a familiar adult (their mother), the factor of unfamiliarity of either setting or person does not seem likely to have had any major influence on the results in the present study.

Time has also been mentioned as a factor contributing to differences noted in the results of the present study. Although records of time taken to complete situations were not included as part of the data-collection plan, typescripts and tape recordings gave a crude indication that situations 4, 5, 6 took longer to complete than the other three situations. This does not necessarily indicate that they were more demanding than the other situations. It may well have been that the children just kept producing more of the same type of utterance. As the results indicated, these three

situations, in fact, produced the smallest LCI's. If the situations were more demanding, then the results would suggest that this resulted in simpler rather than more complex utterances.

As earlier discussion has indicated, many references have been made in the literature as to the effect of different persons in the language situation; the effect of the mother, the effect of the experimenter, even the effect of the size of the group. The results of the present study are not sufficiently detailed to indicate with any certainty the degree of this person effect. However, there was a close relationship between the dichotomy of the situations and the involvement of the two adults (the investigator and the mother) in these situations. The clue to any differential influence in this direction most probably lies in the type of questions asked by the mothers and by the investigator. An examination of this type would have involved an analysis beyond the scope of the present study. This observation, however, lends support to the contention stated above, that the language elicited should not be seen in isolation from the situation within which, or in response to which, it occurred. If a sample of language was elicited, for example, in a situation that required responses to closed questions or statements then the child's production may be a very poor representation of his language performance in general.

The notion that the stimulus potential of the situation items themselves contributed to the differences noted in the results of the present study gained support from other research findings. The nature of any single situation may, therefore, be such that different demands are placed upon the complexity of the language required to cope with that situation. In response to one situation,

for example, a simple response may suffice, in another a complex explanation may be required. It was interesting to note that Baldwin & Frank (1969) found it necessary, for reasons of significant differences in the complexity of the language used, to identify the toy played with and the resulting speech.

Another factor that received considerable attention was the reliability of the sample of language elicited. While the number 50 figured prominently in many research studies, the discussion of the results on the quantitative measures questioned the appropriateness of this number for measures concerned with the complexity of the language elicited. Although the mean total number of utterances elicited from the six situations collectively in the present study exceeded 250, three of the individual situations yielded a mean number of utterances less than 50. Therefore, the differences between situations, noted in the results, may have been influenced by the unreliability of the sample analyzed. However, in view of mean size of the total sample elicited in the present study, the unreliability of the sub-samples is not likely to be as great as would be expected in studies that have used a total sample of 50 utterances elicited from more than one situation. The problems associated with summing a number of small sub-samples to produce a total of 50 utterances were discussed at some length in Chapter III. This discussion suggested that if a number of different situations were to be sampled, then a minimum of at least 50 utterances from each situation would be more likely to produce a reliable sample of language.¹

Eliciting a minimum of 50 or 100 utterances per stimulus item

1 If the language sample were to be analyzed using a qualitative measure then a minimum of 100 utterances per situation would probably provide a more reliable sample.

poses serious problems for the collection of language samples from young children. It may well be necessary to categorize situations and deal with, for example, the school situation, the home situation, the play situation, and so on. Within these broader situations it may be possible to delimit a number of smaller units and to identify with these the language elicited in them. Thus, future research may build a composite picture of 'home' language, 'school' language, 'play' language, and the like as dialects of a more global child language. The implications for future research designs of such suggestions involve a much more sophisticated approach to the question of sampling children's language than has been apparent in many studies in the past.

It is most unlikely that the differences found between samples of language in the present study involve only one of the factors discussed, or indeed other factors that have not been discussed. A more probable conclusion would involve a statement that language samples elicited from the same subjects in a number of different situations differ not only in production, as measured by the number of phrases or utterances, but also in structural complexity, as measured by NPI, VPI, and LCI. The statement would also note that these differences most probably arise as the result of the combination of a number of factors that include the nature of the situations, their stimulus potential, the demands they place on language responses, and the effect of the different persons involved in the language situation.

Future research may need to take cognizance of such factors as those mentioned above, and include them as an integral part of the research plan. It would not seem to be sufficient to elicit and

analyze a sample of language, without giving due recognition to the fact that the language elicited was in response to a specific situation that may have placed specific demands on the type of language elicited, under specific control of one or more persons, who in turn may have exerted a specific influence on that situation.

APPENDIX A

INITIAL CIRCULAR TO PARENTS
OF PROSPECTIVE SUBJECTS

When the population that met the criteria for the selection of subjects had been arranged in random order, the following circular was sent to the parents of the first ten boys and the first ten girls on the list.

Dear Mr and Mrs _____,

Mr _____ letter has introduced a research project that I am proposing at your school and the way in which it is hoped this will add to our knowledge and understanding of how our children develop their language ability.

Your child, _____, was selected to take part in this project in very much the same way that one has a chance of winning a lottery. The names of the children were drawn from a larger group in which everyone had a chance of being selected, but only a few children were required.

Briefly, I would like to explain what this research will involve. Firstly, at school I will be gathering samples of language from the children in different situations. Secondly, I would like to gather samples of the language children use when talking with their mothers. This would involve the mother being present, with the child, on two or three occasions for approximately 30 to 45 minutes per session, either at the school or at the University of _____, during the first half of Term II of this year. Transport would be provided where this was required.

It may well be that the mother would like to assist with this project but works during the day. However, this problem could be overcome.

As you can imagine, research projects of this type rely very heavily on the goodwill and co-operation of the parents involved, and I sincerely hope that you will be able to assist me in completing what I believe to be a project that will add to our understanding of how our children develop and use their language.

Finally, may I assure you that all information given is confidential to myself and in the results that will be published no child is identified individually. I would be grateful if you could forward the slip below by return mail in the stamped addressed

envelope provided.

Yours sincerely,

RESEARCH SURVEY ON CHILDREN'S LANGUAGE

Mrs _____

Please tick
appropriate
box/es

1. I would be willing to take part in the
mother-child sessions
 - (a) I am available during the day
 - (b) I am not available during the day
2. I am not able to assist you in your
research survey.

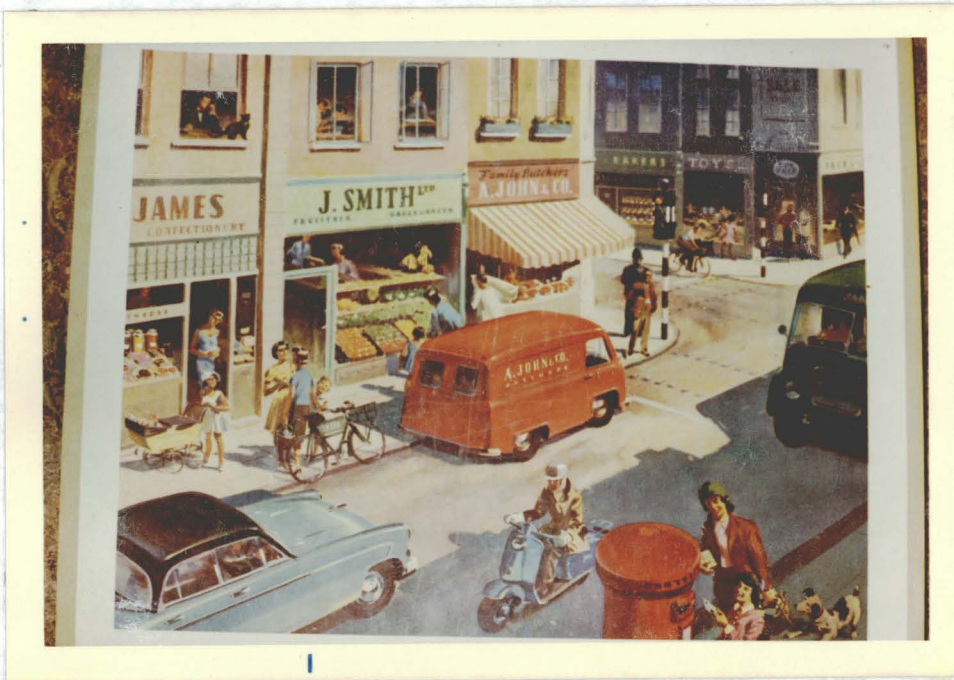
Signature _____

If you have ticked boxes in Section 1, I will contact you personally with further details in the near future.

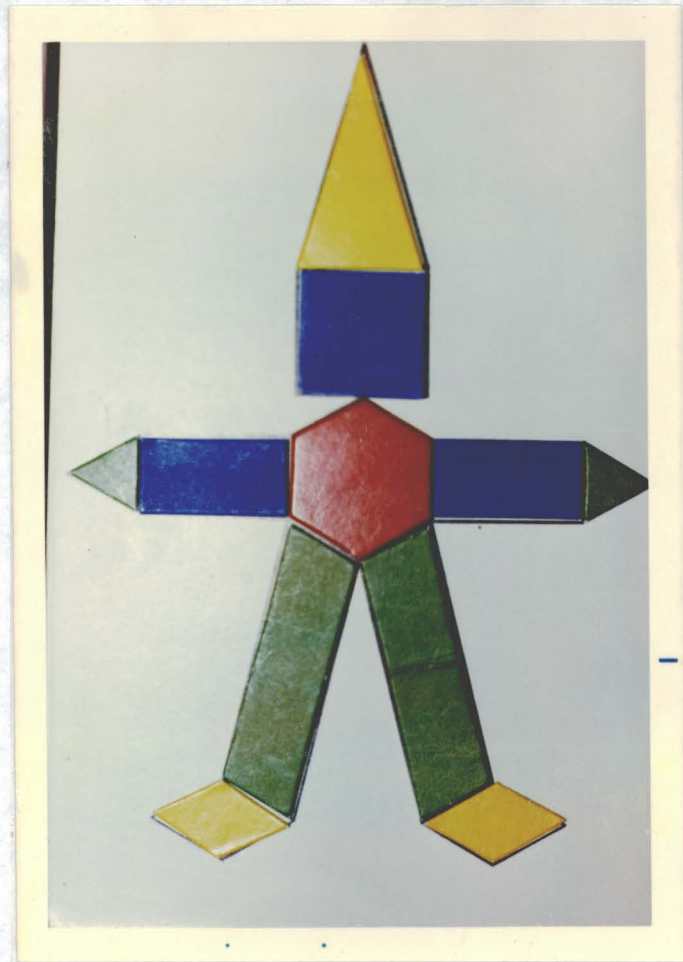
APPENDIX B

MOTHER - CHILD CONDITION
(CONDITION 3)

This involved three situations, and the pictures below show the tasks used in these situations.



Situation 4. Picture Discussion



Situation 5. Shape Construction



Situation 6. Jig-saw Puzzle

APPENDIX C

SCORING PROCEDURES FOR THE LENGTH COMPLEXITY INDEX.

The following is a summary, with appropriate examples, of the major points developed in a report by Miner (1969) on scoring procedures for the length complexity index (LCI). This measure encompasses both sentence length and sentence complexity, considered together according to a weighted numeric system. The final LCI score is the sum of noun phrase (NP), verb phrase (VP), and additional points (AP) divided by the number of sentences (NS) in the sample. Subsidiary indices can be obtained for Noun Phrases and for Verb Phrases. Procedures for obtaining these are outlined below.

1) Transcribing the Responses.

The child's responses should be recorded precisely paying attention to inflected endings, pauses and repetitions. The language segment analyzed is the sentence not the "per breath utterance" as in the mean length of response. The sentence may be either complete or incomplete and will extend occasionally across a pause:

His father washes the car - (pause) on Saturdays.

2) Word Count.

Starters, unless they serve a sequencing function, are eliminated and not scored:

oh, and, now, um, Mr X.

Word and/or phrase repetitions are omitted:

I saw, I saw the car. It was a fat fat hen. (Omit the underlined words).

Proper names in apposition and elliptical responses are

eliminated:

Tom, where are you going?

Subject and predicate contractions count as two words:

I'm, where'll, I'd, he'd, you've, mine's.

Contractions of the verb and negative are counted as only one word:

didn't, can't, ain't, isn't.

Hyphenated words and compound words designating a single object are counted as single words:

merry-go-round, cowboy, Santa Claus.

All prepositions are counted except where it is considered part of the infinitive construction or when it is the last word in a sentence and is elliptical:

I'm ready to eat, I like to.

3) Noun Phrase

Nouns and pronouns with a nominative function are counted as nouns (N). Pronouns serving a possessive function are counted as noun plus possessive (N + Poss) where the correct form is used.

Adjectives and adverbs are counted as modifiers (M).

A and the score as articles (A) except when a is obviously a reduction of another word:

some a this, take a back.

Plural inflections (P) are not counted separately for words which are used only in the plural form:

Examples	Symbols	Score
the dogs	A + N + P	3
his old hat	N + Poss + M + N	4
a big old dog's dish	A + M + M + N + Poss + N	7 ¹

4) Verb Phrase

Only lexical verbs and connectives are counted. This procedure eliminates the problem of deciding whether a preposition is part of a verb. One exception to this general rule relates to the use of preverbs by many children. Since these indicate a transitional development in verb forms they are scored 1 point:

gonna, shoulda, woulda.

Present tense verbs, both regular and irregular forms are scored 1 point. Past tense verbs for both regular and irregular forms are scored 2 points.

Examples	Symbols	Score
gonna	Pre V	1
go, jump	V	1
hops	V + P	2
going, jumping	Pr Pt	2
is going	Aux + Pr Pt	3
could have gone	Aux + Aux + PP	4
am going to try to fix	Aux + Pr Pt + V + V	5

5) Additional Points

Additional points are given for the use of conjunctions, negatives and questions.

i) Conjunctions. These are scored 1 point. However, con-

1 The use of two or more modifiers gains an additional point.

joining several sentences with the conjunction and may result in longer but not necessarily more complex sentences. In the following examples only the underlined words would be scored:

That's a bear and that's a bear there and that's a bear there.

My mother and my father and my brother and my sister went to the store.

ii) Negatives. Four different point levels of negatives are defined. Where the negation no or not appears either at the beginning or at the end of an utterance, but not within, score as 1 point:

no wash, wear mitten no.

Two auxiliary verbs (can't, don't) appear in the negative form and the negative element now appears within the sentence. Score as 2 points:

I no bit you, I don't know.

The negative form can appear between the noun phrase and the present participle. Score as 3 points:

Me not crying, I no peeking.

The last level reflects the adult version of the negative and includes appropriate intonation. Score as 4 points:

No, it isn't, You didn't eat supper with us.

iii) Questions. Two levels of question are distinguished. At the first level there are no auxiliaries and no subject-verb inversion. Score as 1 point:

Mummy eggnog? I ride train? Who dat?

At the second level, questions contain an auxiliary or some form of do. Score as 2 points:

Can't you work? What he can ride in?

The auxiliary is optional in wh questions:

What is he writing? What he is writing?

6) Numeric Analysis

Determine the assigned weights for each sentence according to the scoring rules. The sentences below provide examples of the scoring procedure. NP_1 is the grammatical subject of the utterance. VP_1 consists of the main verb and auxiliaries. NP_2 is the NP nested in the VP which predicates NP_1 . VP_2 is the predicate of NP_1 and consists of VP_1 and NP_2 .

Using this numeric analysis, three measures can be computed: noun phrase index (NPI), verb phrase index (VPI) and length complexity index (LCI). The three formulas are as follows:

$$NPI = \frac{\text{Number of } NP_1 \text{ points}}{\text{Number of } NP_1 \text{'s}}$$

$$VPI = \frac{\text{Number of } VP_1 \text{ points}}{\text{Number of } VP_1 \text{'s}}$$

$$LCI = \frac{NP_1 \text{ points} + VP_2 \text{ points} + AP}{\text{Number of sentences}}$$

Examples of scored sentences are set out on the next page.

Scoring Procedures

	NP		VP		AP		
	NP ₁	NP ₂	VP ₁	VP ₂	C	Ng	?
1. A girl A + N	2	0	0	0	0	0	0
2. Playing with the ball Pr Pt + Prp + A + N	0	3	2	5	0	0	0
3. We play with trucks in it N + V + Prp + N + P + Prp + N	1	5	1	6	0	0	0
4. Sometimes we have dollies 'n sometimes we don't M + P + N + V + N + P + C M + P + N + V + Ng	3 3	2 0	1 1	3 1	1 0	0 4	0 0
5. You know why? N + V + N + ?	1	1	1	2	0	0	2
6. You wind it - you wind the thing around N + V + A + N + M	1	3	1	4	0	0	0

Treat compound, complex, and compound-complex sentences as separate base structure sentences.

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