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EFFECTS OF INSTRUCTIONAL SET
ON FREE-SPEECH SAMPLES

by

Elizabeth Maria Zischka

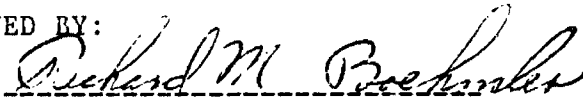
B.A., University of British Columbia, 1978
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requirements for the degree of Master of Arts in the
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the University of Montana

1982

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Chairman, Board of Examiners



Dean, Graduate School

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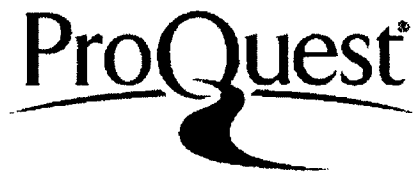


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Effects of Instructional Set on Free-Speech Samples (82 pp.)

Director: Richard M. Boehmler, Ph. D.

Thesis Approved:

Richard M. Boehmler

Two instructional sets ('play' versus 'speech/language') were administered to each of twelve mothers prior to their interacting with their respective child. Free-speech samples were analyzed to determine whether significant differences in both mothers' and children's expressive language were dependent upon instructional set. Results indicated that although mothers asked a significantly greater number of interrogatives in the speech/language condition, the children's expressive language was not significantly influenced by instructional set.

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CHAPTER I
REVIEW OF THE LITERATURE

As part of a child's speech and language evaluation, clinicians frequently obtain a free-speech sample to assess the child's expressive language abilities. Variables influencing expressive language behavior during free-speech samples have been subject to review. Research to date has examined the topic (Longhurst and Grubb, 1974), the situation (Kramer, James and Saxman, 1979; Scott and Taylor, 1978) and the elicitor (Ickes and Newton, 1980; Olswang and Carpenter, 1978). Longhurst and Grubb (1974) concluded that less structured topics (i.e., conversation with another child or adult) resulted in a more optimal sample of the child's expressive language abilities than structured, task-oriented topics (i.e., having the child "tell me all you can about" (p. 72) objects or pictures). Additional studies by Kramer, James and Saxman (1979) and Scott and Taylor (1978) compared home-obtained free-speech samples, using mother as elicitor with clinic-obtained samples using the clinician as elicitor. Extrapolating from these previous studies, Ickes and Newton (1980) and Olswang and Carpenter (1978) examined differences in free-speech samples in the same setting but with

different elicitors. Both investigators concluded that familiar elicitors, mothers, were able to obtain a significantly greater number of utterances in a given period of time than were unfamiliar elicitors, clinicians. Qualitative measures were not significantly affected by the different elicitors.

Careful scrutiny of these studies indicated a progressive delineation of conversational factors affecting free speech samples which culminated in those studies comparing familiar elicitor with unfamiliar elicitor. These studies favoured mothers versus clinicians in terms of number of utterances elicited from the child (Ickes and Newton, 1980; Olswang and Carpenter, 1978). Since clinical use of the mother as elicitor appears to be justified based on these studies, a research design examining variables influencing the mother as elicitor would be useful. One such variable is the instructions the mother receives.

Although instructions to the elicitor are an integral part of obtaining a free-speech sample, to date no attempt has been made to examine this variable. In the studies reviewed, mothers were told either to play with their child (Ickes and Newton, 1980; Olswang and Carpenter, 1978; Scott and Taylor, 1978) or

interact with their child to obtain a spontaneous language sample (Kramer et al., 1979). Instructions to the clinician included getting "...a good language sample..." (Ickes and Newton, 1980, p. 1) and focused on either unstructured play (Scott and Taylor, 1978), the use of Lee's (1974) specific elicitation technique (Olswang and Carpenter, 1978), or were not specified (Kramer et al., 1979). The wide variability of instructional set across studies and across mothers and clinicians within studies provided no information concerning the effect, if any, of the instructional set itself.

Although instructional set has not been examined with regard to free-speech samples, research in the field of psychology suggests that the instructions a subject is given may influence the results of the study. Investigations which have noted differences in outcome dependent on what the subject is told include studies in placebo research (Berg, Laberg, Skutle and Ohman, 1981; Brown, Goldman, Inn and Anderson, 1980; Connors and Maisto, 1979), and investigations in which the performance of subjects is manipulated by giving different instructions (Bach, Corlett and Dickinson, 1978; Bolt, 1978; Hedges and Dickinson, 1979) or by providing differential expectation statements (Bartels, Beck and Clayson, 1979). Of more relevance to the

present discussion are two studies which have examined children's performance on the Weschler Intelligence Scale for Children (WISC). Strang, Bridgeman and Carrico (1974) compared third-graders' performance, as a function of receiving either 'game' or 'test' instructions on three nonverbal subtests of the WISC: picture completion, picture arrangement and picture assembly. "The results indicate that defining three subtests from the WISC as a game rather than a test yields significantly superior performance among third-grade students."(Strang, Bridgeman and Carrico, 1974, p. 126). A further study by Bridgeman, Strang and Buttram (1974) extrapolated from the Strang et al.'s (1974) findings and concluded that the type of task (verbal versus nonverbal) and grade of the child (third versus sixth) were two more variables to consider when comparing 'game' versus 'test' instructions. Their results indicated that sixth grade 'test' verbal scores were superior to 'game' verbal scores and to both 'test' and 'game' nonverbal scores. No other significant findings were noted. The findings from the Bridgeman et al.'s study are especially pertinent to the possible effect of instructional set on free-speech samples. Their study suggested that 'test' instructions influenced verbal scores more than 'game' instructions for sixth graders. Since a free speech

sample is used to evaluate expressive language the instructional set 'test' (speech/language) versus 'game' (play) administered may influence the elicitor and hence, possibly, the free-speech sample obtained.

In summary, a review of the literature has indicated that: 1) free-speech samples obtained with a familiar adult, the mother, result in a greater number of utterances from the child than a sample obtained by an unfamiliar adult, the clinician, 2) instructional set has not been investigated with regard to free-speech samples and 3) research in psychology suggests that the instructions a subject is given may influence the results of the study. The combination of these findings suggests the need to examine instructional set using a familiar elicitor.

Statement of the Problem

The purpose of the present study was to investigate the effect of instructional set on free-speech samples using the mother as elicitor. Two instructional sets observed in the previous literature were used: play (instructional set P) and speech and language (instructional set S). The expressive language of both the mothers and their children was examined for differences due to the different instructional sets. The

following hypotheses were made regarding the mothers' and children's expressive language. Rationale for these hypotheses is based on previous literature (see Appendix II).

1. Mothers would have a significantly greater number of utterances per minute in Instructional Set S;

2. Mothers would have a significantly greater total number of interrogatives about materials present in Instructional Set S;

3. Mothers would have a significantly greater total number of interrogatives in Instructional Set S;

4. Mothers would have a significantly greater number of imperatives in Instructional Set S;

5. Mothers would have a significantly greater number of declaratives in Instructional Set S.

It was also hypothesized that:

1. Children would have a significantly greater number of utterances per minute in Instructional Set P;
2. Children would have a significantly longer MLU (Mean Length of Utterance) in Instructional Set P.

Statistically, the above hypotheses will be supported if the null forms of these statements can be rejected.

CHAPTER II

METHODS

Subjects

Subjects were twelve normally developing three-year-olds, nine boys and three girls and their respective mothers. The children ranged in age from three years, one month to four years. The sample used was randomly drawn from available subjects attending one of five daycare centers in Missoula County, Montana (see Appendix A for subject selection rationale and Appendix B for descriptive data on subjects and daycare centers). From the five daycare centers, a total of thirty-eight three-year-olds were judged by daycare personnel to be developing speech and language skills normally. From these thirty-eight subjects, twelve were selected to participate in the study (see Appendix E for details). After volunteering, both mother and child had to pass a screening test for hearing acuity in accordance with ASHA (1975) guidelines for inclusion in the study. (Appendix C contains ASHA guidelines and instructions given to the subject).

Materials

The study was conducted at the University of Montana Speech, Hearing and Language Clinic. Both experimental conditions occurred in the same room. The room contained toys, a table, and two chairs. Toys included a Sesame Street Play Family House set, a wooden doll house with dolls, a play cookstove with dishes, three trucks and assorted blocks. The room had a one-way mirror through which the subjects were observed by the experimenter during the ten-minute interaction periods. Administration of the instructional sets, screening for hearing and the five-minute break took place in an adjacent room.

The ten-minute interactions were recorded with an Akai (Model 1722W) audio tape-recorder and a Sony (Model AV-3650) video-audio system. The microphone for the video-audio system was a Turner Company (Model 2302) and was suspended from the ceiling. The video camera was mounted in a corner of the room to be unobtrusive and was controlled remotely. The tape-recorder was placed in the observation room and its microphone, a Sony Electret Condenser (Model ECM 22), was taped to the Turner Company microphone. Before use, all equipment used was thoroughly inspected by an electronics technician to ensure

proper function and the heads on the video-audio system and tape-recorder were cleaned. The experimenter recorded the instructions, then this recording was played to each of the mothers.

Instructional Sets

Two instructional sets observed in the previous literature were used. Instructional Set P requested that the mother play with her child as she normally would at home and Instructional Set S requested the mother to interact with her child in such a way as to provide the examiner with a clear indication of her child's speech and language skills (Appendix D contains the exact instructional sets given to the mothers). All twelve subjects received both instructional sets, with odd numbered subjects (1-11) receiving P first and even numbered subjects (2-12) receiving S first.

Procedure

Once a subject had been selected, the mother was contacted by phone to request her participation and a convenient time was scheduled for her and her child to participate. Upon arrival at the clinic, the mother-child pair were greeted and taken to the

room designated for administering the instructional sets. Dependent upon whether the subject was odd or even numbered, either play or speech/language instructions were administered first. In this way, order of instructions was counterbalanced. Criteria for understanding the instructions was indicated by the mother using either the word 'play' or 'speech' or 'language' when she reiterated the instructions. If criteria was not met, the instructions were repeated. Instructions did not have to be repeated to any of the mothers. The mother and her child were then taken to the experimental room to participate in the first experimental condition. A five minute break was conducted after the first condition. The procedure for the second experimental condition mimicked the first condition. Each experimental condition was from ten to twelve minutes long. In most cases observation indicated that there would be sufficient verbal behavior to compute MLU. However, in two instances there was some doubt as to whether fifty utterances in the four-minute period would be obtained and those two conditions were extended for an additional two minutes. After both experimental conditions were completed, the mother-child pair was taken back to the instructional room where the screening test for hearing acuity was conducted. (Appendix E contains complete procedural

details).

Analysis

The twenty-four tape-recordings were randomly numbered by an independent adult such that identity and instructional conditions were unknown to the experimenter during transcribing and scoring. Transcription was done by a student unaware of the purpose of the study. Verbatim transcriptions were made starting at the end of the first three minutes and continuing until fifty utterances or four minutes, whichever was longer. A four minute sample was sufficient, to obtain fifty utterances, for fifteen of the twenty-four subjects. Minutes for the other subjects were calculated in one-half minute units. The time required to obtain fifty utterances for the other nine subjects varied from 4.5 to 8 minutes. (Appendix Q contains information on those nine subjects).

Dependent language measures used were chosen on the basis of their usefulness as determined by previous studies (see Appendix II for details). The measures calculated for the mothers' language were total number of: utterances per minute, interrogatives, interrogatives about materials present in the immediate environment, imperatives and declaratives. Measures

calculated for the childrens' language were total number of utterances per minute and MLU. (see Appendix I for operational definitions and calculation procedures for the dependent measures).

Significant differences in expressive language dependent on instructional set were evaluated by comparing mean values of the various dependent measures using a Latin Square Design: Simple Analysis of Variance (Bruning and Klintz, 1968). This design is a variation of a repeated measures design wherein order of treatments (in this case, instructional set) is counter-balanced.

The coefficient of risk was predetermined at $p < .05$, a level used by most behavioral studies. Further rationale for this level was based on the exploratory nature of the study, sensitivity of the language measures and procedures. Finally, a larger coefficient of risk might lead to the rejection of the null hypothesis because of obtained differences in verbal language so small that they would not be of clinical importance.

Reliability

Intra-judge

Ten mother and ten child utterances were rescored by the student who performed the transcription of the tapes, to determine word-for-word reliability. Reliability ranged from 93% to 100% for mother utterances and from 75% to 100% for child utterances.

Ten mother and ten child utterances from each of nine randomly chosen tapes were rescored by the experimenter for each of the dependent measures (interrogatives, interrogatives about materials present, declaratives, imperatives, MLU). Percentage of agreement was 85% or higher except for MLU. MLU reliability scores were 100%, 100%, 86%, 86%, 100%, 100%, 100%, 78%, and 71%.

Finally, ten mother and ten child utterances from each of three randomly chosen tapes were rescored by the experimenter to determine intra-judge reliability for total number of utterances. Percentage of agreement for both mother and child utterances was 100, 100, and 99.

Inter-judge

Two tapes were transcribed in total, by the experimenter, to determine word-for-word inter-judge reliability. Percentage of agreement was 97 and 92 for mother utterances and 93 and 94 for child utterances.

Ten mother and ten child utterances from each of six randomly chosen tapes were scored by an independent adult after being familiarized with the criteria and guidelines. Inter-judge reliability for interrogatives about materials present, declaratives, and imperatives was 90% or higher. MLU reliability scores were 100%, 100%, 100%, 86%, 86%, and 86%.

Finally, ten mother and ten child utterances, randomly chosen, were scored by an independent adult to determine inter-judge reliability for total utterances. Percentage of agreement for child utterances was 100, 100, 95, 85, and 78. Percentage of agreement for mother utterances was 100, 100, 94, 93, 88, and 84.

Reliability was comparable to that achieved by previous researchers (Longhurst and Grubb, 1974; Olswang and Carpenter, 1978; Scott and Taylor, 1978).

CHAPTER III

RESULTS

Mother's Language

Mean values for instructional (I) set (P versus S), order (O1 versus O2), and instructional set by order interaction (I X O) for the five dependent measures are presented in Table 1. Analysis of variance indicated a significant instructional effect ($F=5.55$; $df=1$; $p<.05$) on total interrogatives. Mothers asked their children an average of 36.10 questions in the play condition versus an average of 45.95 questions in the speech/language condition. In other words, mothers asked approximately 27% more questions in the speech/language condition. All other effects for total interrogatives were nonsignificant. No other significant mean differences were obtained on the other four measures. (Appendix J contains the ANOVA source tables and Appendix K contains the raw data).

TABLE 1
MEAN VALUES FOR MOTHERS' MEASURES

1. INTERROGATIVES

	Instructional Set		Means of Order (O)
	<u>Play</u>	<u>Speech/Lang</u>	
	<u>P</u>	<u>S</u>	
Order 1	40.500	42.400	41.450
Order 2	31.700	49.500	40.600
Means of (I)	36.100	45.950	

2. UTTERANCES PER MINUTE

	Instructional Set		Means of Order (O)
	<u>Play</u>	<u>Speech/Lang</u>	
	<u>P</u>	<u>S</u>	
Order 1	16.750	18.400	17.570
Order 2	16.900	16.430	16.700
Means of (I)	16.825	17.415	

3. DECLARATIVES

	Instructional Set		Means of Order (O)
	<u>Play</u>	<u>Speech/Lang</u>	
	<u>P</u>	<u>S</u>	
Order 1	49.400	48.500	48.950
Order 2	60.170	42.400	51.285
Means of (I)	54.785	45.450	

TABLE 1 (cont.)

4. IMPERATIVES

	<u>Play</u> <u>P</u>	<u>Speech/Lang</u> <u>S</u>	Order (O)
Order 1	5.500	6.170	5.835
Order 2	4.170	4.500	4.335
Means of (I)	4.850	5.335	

5. INTERROGATIVES ABOUT MATERIALS PRESENT

	Instructional Set		Means of
	<u>Play</u> <u>P</u>	<u>Speech/Lang</u> <u>S</u>	Order (O)
Order 1	11.170	14.170	12.670
Order 2	4.700	6.500	5.600
Means of (I)	7.935	10.330	

Children's Language

Mean values for instructional set (P versus S), order (O1 versus O2), and instructional set by order interaction (I X O) for the two dependent measures are presented in Table 2. Analysis of variance indicated no significant mean differences for these measures. (Appendices L and M contain the ANOVA Source

Tables for the two measures and raw data, respectively).

TABLE 2

1. UTTERANCES PER MINUTE

	Instructional Set		Means of Order (O)
	<u>Play</u> <u>P</u>	<u>Speech/Lang</u> <u>S</u>	
Order 1	12.250	11.800	12.025
Order 2	12.700	13.800	13.250
Means of (I)	12.470	12.800	

2. MEAN LENGTH OF UTTERANCE

	Instructional Set		Means of Order (O)
	<u>Play</u> <u>P</u>	<u>Speech/Lang</u> <u>S</u>	
Order 1	3.317	3.510	3.413
Order 2	3.340	3.670	3.505
Means of (I)	3.328	3.590	

Post Hoc Analysis

Post hoc analyses were done on some of the data to determine whether order significantly influenced the mean frequency of utterance length. Rationale for doing such analyses were

primarily based on the writer's subjective impression that the children appeared to use longer utterances in the second order, regardless of instructional set. In addition, the analyses were performed to delineate variables useful for future research. Caution regarding interpretation of these analyses must be exercised since the analyses were done after the fact.

A distributional analysis of mean frequency of utterance length was done (see Figure 1). Visual inspection did not indicate any dominant pattern of responding dependent upon order. However, children did have a slightly greater average number of sentences with an MLU of one and six-or-greater in the second order regardless of instructional set. They also had fewer sentences with an MLU of two, three, four and five in the second order (see Table 3). Analysis of variance performed on those three groups of sentence length, indicated a significant order effect ($p \leq .05$) for the group with MLU of two through five (see Appendix N for Anova Source Tables). Separate analysis of variance performed on the frequency values for MLUs of two, three, four and five indicated that only the sentences with an average length of four decreased significantly in the second order. The significant result obtained for only one out of the seven post hoc analyses performed is most likely due to artifacts

and should be interpreted with extreme caution.

FIGURE 1

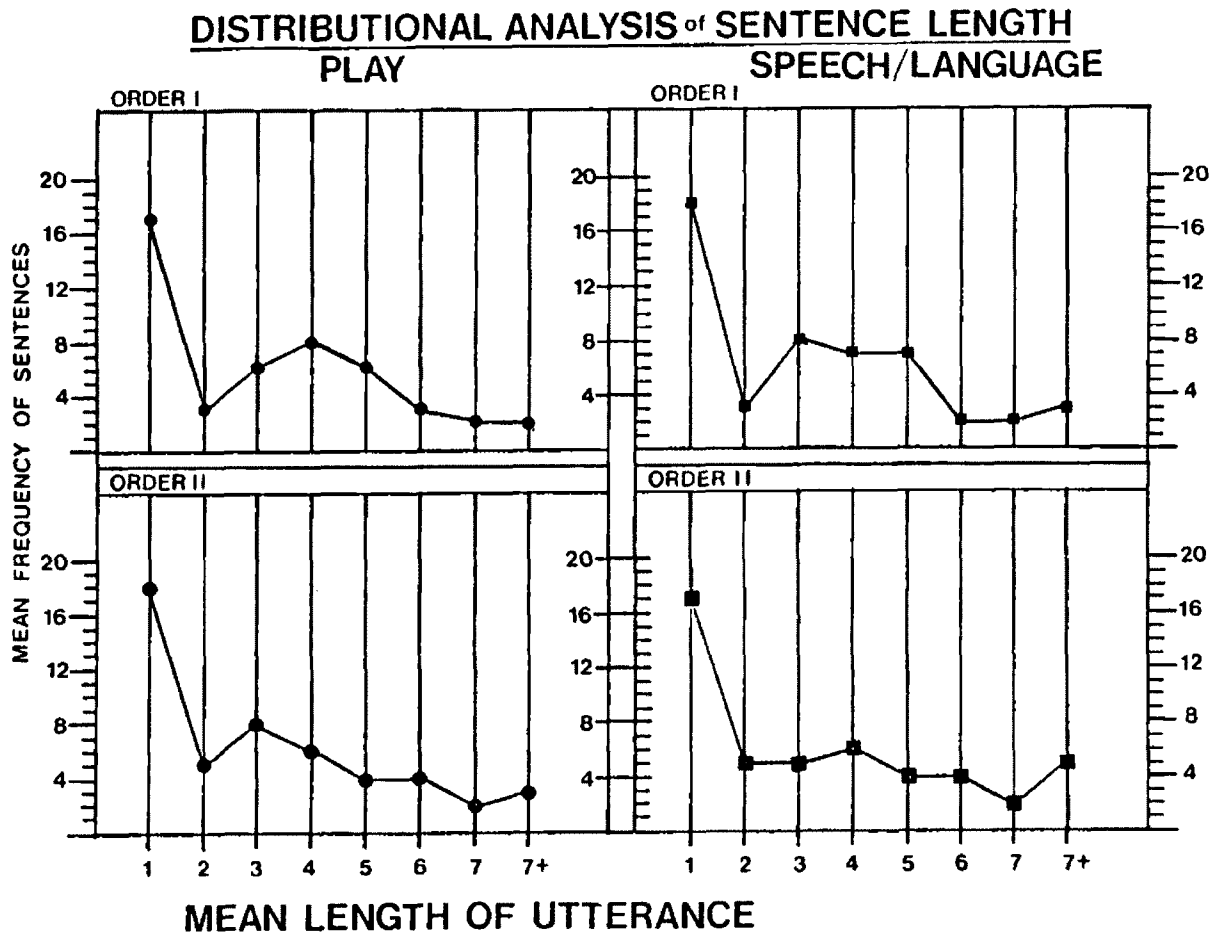


TABLE 3
MEAN FREQUENCY VALUES FOR SENTENCE LENGTH

One

	Order 1	Order 2	Ave. I
<u>Play</u>	17.0	18.0	17.5
<u>Speech/Lang</u>	14.0	17.0	15.5
Ave. 0	15.5	17.5	

Two

	Order 1	Order 2	Ave. I
<u>Play</u>	5.0	3.0	4.0
<u>Speech/Lang</u>	4.0	5.0	4.5
Ave. 0	4.5	4.0	

Three

	Order 1	Order 2	Ave. I
<u>Play</u>	6.0	8.0	7.0
<u>Speech/Lang</u>	8.0	5.0	6.5
Ave. 0	7.0	6.5	

TABLE 3 (cont.)

Four

	Order 1	Order 2	Ave. I
<u>Play</u>	8.0	6.0	7.0
<u>Speech/Lang</u>	7.0	6.0	6.5
Ave. 0	7.5	6.0	

Five

	Order 1	Order 2	Ave. I
<u>Play</u>	6.0	4.0	5.0
<u>Speech/Lang</u>	7.0	4.0	5.5
Ave. 0	6.5	4.0	

Six

	Order 1	Order 2	Ave. I
<u>Play</u>	3.0	4.0	3.5
<u>Speech/Lang</u>	2.0	4.0	3.0
Ave. 0	2.5	4.0	

TABLE 3 (cont.)

Seven

	Order 1	Order 2	Ave. I
<u>Play</u>	2.0	2.0	2.0
<u>Speech/Lang</u>	2.0	2.0	2.0
Ave. 0	2.0	2.0	

Seven or Greater

	Order 1	Order 2	Ave. I
<u>Play</u>	2.0	3.0	2.5
<u>Speech/Lang</u>	3.0	5.0	4.0
Ave. 0	2.5	4.0	

CHAPTER IV

DISCUSSION

Based on previous literature favouring mothers over clinicians as elicitors (Olswang and Carpenter, 1978), mothers are frequently requested to interact with their child in a clinical setting so that the clinician can obtain a free-speech sample. In the present study instructional set was manipulated to determine its influence on the verbal output of mothers and their children. Two instructional sets observed in the literature were used: play (Instructional Set P) and speech/language (Instructional Set S).

For the sake of ease and clarity, discussion of the results obtained for Mothers' and Children's Language will be addressed separately.

Mother's Language

This writer hypothesized that mothers would use significantly more Utterances per Minute, Imperatives, Declaratives, Interrogatives-about-Materials-Present and Total Interrogatives in the speech/language conditions than in the play

conditions. Significant results were obtained only for Total Interrogatives. Mothers asked 27% more questions in the speech/language conditions than in the play conditions. Previous research (Hubbell, 1977; Prutting et al, 1978) concluded that clinicians frequently rely on questions when attempting to elicit conversation from a child. The present study further suggests that mothers also rely on questions when attempting to elicit conversation from their children.

Significant results were not obtained on the other four language measures for either instructional set or order. Mothers appeared to have distinctive styles and varied enough from each other to preclude, with the exception of total interrogatives, the possibility of significant results for either instructional set or order. However, patterns observed in the data merit discussion for the purposes of future research and clinical application. The most striking pattern in responding was for interrogatives-about-materials-present. The null hypothesis was not rejected for either an instructional or order effect on this measure. Visual scrutiny of the data, however, suggested that the number of interrogatives-about-materials-present might be related to Order. Mothers in Order I asked an average of 12.7 interrogatives-about-materials-present whereas mothers in Order 2

only asked an average of 5.57 such questions. It was observed that 9 of the 12 mothers asked fewer interrogatives-about-materials-present in Order 2. The consistency in responding for all but three mothers indicates the advisability of using a larger number of subjects in subsequent research.

There are several plausible explanations as to why most mothers in this study asked more interrogatives-about-materials-present present in Order 1. First, these mothers may have been attempting to make themselves and their child more comfortable within the confines of a strange environment. The mothers did this by asking questions about the most obvious things--the materials present. Likewise mothers in Order 2 did not need to ask as many interrogatives-about-materials-present because they felt more comfortable and possibly perceived their child to be more comfortable also. Finally, the mothers may have asked more interrogatives-about-materials-present in Order 1 because they had more possible questions they could ask and in Order 2 did not want to repeat themselves by asking the same questions. Materials in the present study were controlled since previous research has demonstrated that both quantity and quality of language obtained from children varies with different stimuli

(Longhurst and Grubb, 1974; Cazden, 1970). If the observed patterns lead the reader to retain the hypothesis that order will effect the number of interrogatives-about-materials-present then subsequent research could examine the variable of topic simultaneously with instructional set and order. For example, previous research suggests that a child's verbal output is influenced by the stimuli used (Longhurst and Grubb, 1974). A counter-balanced design manipulating sets of materials, instructional set and order, could effectively examine these three variables.

In summary, the obtained difference in this study for interrogatives-about-materials-present was not statistically significant. However, the logic of the explanations offered and the consistency in responding across most mothers suggest that mothers would ask more interrogatives-about-materials-present in Order 1.

No patterns of differences in responding were observed for Total Utterances per Minute , Imperatives, or Declaratives. Overall, these findings suggest that mothers might respond individually to instructional set except for total interrogatives for which a group instructional effect was indicated.

Children's Language

It was hypothesized that children would have a greater number of Total Utterances per Minute and a longer MLU when mothers received the speech/language instructions. The lack of significant results obtained suggests that quantity of verbal output from the child is not significantly influenced by the instructional set the mother receives. Visual inspection of the raw data did not indicate any pattern in responding for either instructional set or order. A possible explanation for the lack of significant results is that the children were not "aware" of changes in their mothers' verbal output even when the mothers asked significantly more questions. Proponents of the theory that speech development is intimately related to cognitive development might argue that because three-year-olds are still egocentric they are not sensitive to others around them. In the present study, children were observed to be 'wrapped up' in their own play with seemingly little regard for their mothers. Instances in which mothers repeated themselves to no avail or asked questions which were ignored were frequently observed. In addition to the age of the children the average MLU obtained might also explain the lack of significant results. In a previous study Scott and Taylor (1978) concluded that significant

differences in utterance length, for home versus clinic samples, were contingent upon an average utterance length (AUL) of 4.5-5.0. Average Utterance Length is defined as the value equidistant between average number of words and average number of morphemes per utterance (Tyack and Gottsleben, 1974). Extrapolating from Scott and Taylor's study, significant changes in the children's language in the present study may have also been contingent upon an AUL of 4.5-5.0 or its equivalent. (In terms of calculation, AUL is slightly lower than MLU). In the present study the average MLU was 3.5. Even taking into consideration the differences in calculation, the average MLU could have been lower than needed to obtain differences due to the different instructional sets. Subsequent research might examine these variables more carefully. Finally, qualitative changes in verbal output other than MLU, though not examined in the present study, may have been indicated even though quantitative changes were not. Bayles (1974) found that the mean length of response (MLR) of nursery school children was unaffected by constraints. A constraint was defined as any event that interrupts the child's ongoing behavior including questions. Bayles, however, did find that a greater vocabulary diversity and length of semantically homogeneous units was obtained under the conditions of

non-constraint. In the present study, changes in the children's verbal output may have also been indicated by using such measures.

Clinical Implications

The results from the present study suggest that mothers can be expected to rely on questions when attempting to elicit conversation from their child. Clinicians may also feel comfortable that neither the child's MLU or Total Utterances per Minute appear to be significantly affected by greater questioning by the mothers. However, the effects of greater questioning on qualitative aspects of verbal output are not clear at this point and further research is indicated.

Clinicians frequently incorporate a "practice" or "warm-up" period into the free-speech sampling period under the assumption that the child's verbal output may be significantly influenced. The post hoc analyses done in this study do not support such an assumption. Although children produced a significantly fewer number of utterances with an MLU of 4 in the second order this significant result was most likely due to artifacts. The lack of significant results obtained on the other six post hoc analyses further suggest that order does not significantly influence mean

frequency of utterance length. Thus, the need for a "practice" or "warm-up" period may not be significant for many children.

CHAPTER V

SUMMARY AND CONCLUSIONS

Clinicians frequently request mothers to interact with their child so that the clinician can obtain a free-speech sample. The results of the present study suggest that, for the sample population and instructional sets used, the expressive language of the child will not be significantly influenced by the instructional set the mother receives. Although mothers in the present study asked approximately 25% more questions in the speech/language condition neither utterances per minute nor MLU for the children were significantly influenced. No overall main effect for order was indicated as a function of the present study.

BIBLIOGRAPHY

- AMERICAN, SPEECH, LANGUAGE AND HEARING ASSOCIATION. Guidelines for identification audiometry, ASHA, 1975, 17, 94-99.
- BACH, T.H., CORLETT, J.T., AND DICKINSON, J. An information analysis of speed and accuracy, Perceptual and Motor Skills, 1978, 47, 355-59.
- BARTELS, M., BECK, J., AND CLAYSON, D. Instructions bias and simple reaction time, Perceptual and Motor Skills, 1979, 48, 774.
- BERG, G., LABERG, J.C., SKUTLE, A. AND OIHMAN, A. Instructed versus pharmacological effects of alcohol in alcoholics and social drinkers, Behavior Research and Therapy, 1981, 11, 55-66.
- BOLT, M. The rokeach value survey: preferred or preferable?, Perceptual and Motor Skills, 1978, 47, 322.
- BRIDGEMAN, B., STRANG, H., AND BUTTRAM, J. Game versus test instructions for the WISC, Journal of Educational Measurement, 1974, 9, 285-288.
- BROWN, R. A First Language, Cambridge, Massachusetts: Harvard University Press, 1973.
- BROWN, S.A., GOLDMAN, M.S., INN, A., AND ANDERSON, L.R. Expectations of reinforcement from alcohol: their domain and relation to drinking patterns, Journal of Consulting and Clinical Psychology, 1980, 48, 419-426.
- BRUNING, J.L., AND KLINTZ, E.L. Computational Handbook of Statistics, Scott, Foresman, and Company: Glenview, Illinois, 1968.
- CAZDEN, C.B. Child Language and Education, Holt, Rhinehart and Wilson, 1972.
- CONNORS, G.J., AND HAISTO, S.A. Effects of alcohol, instructions and consumption rate on affect and physiological sensations, Psychopharmacology, 1979, 62, 261-266.

- COWAN, P.A., WEBER, J., HODDINOTT, B.A. AND KLEIN, J. Mean length of spoken response as a function of stimulus, experimenter and subject, Child Development, 1967, 38, 191-203.
- CRAMBLIT, N.S. AND SIEGEL, G.H. The verbal environment of the language-impaired child, Journal of Speech and Hearing disorders, 1977, 42, 474-482.
- HEDGES, D.G., AND DICKINSON, J. Interactions between instructions for speed versus accuracy and performance, Perceptual and Motor Skills, 1979, 48, 459-464.
- HUBBELL, R.D. On facilitating spontaneous talking in young children, Journal of Speech and Hearing Disorders, 1977, 42, 216-232.
- ICKES, C. AND NEWTON, M. Interactor effects of communicative function in young children, Paper presented at the ASHA Convention; Atlanta, Georgia, 1980.
- KATZ, J.J. AND POSTAL, P.H. An Integrated Theory of Linguistic Descriptions, M.I.T. Press: Cambridge, Massachusetts, 1964.
- KRAMER, C.A., JAMES, S.L., AND SAXIAN, J.H. A comparison of language samples elicited at home and in the clinic, Journal of Speech and Hearing Disorders, 1979, 44, 321-330.
- LEE, L. Developmental Sentence Analysis, Northwestern University Press: Evanston, Illinois, 1974.
- LONGHURST, T. AND GRUBB, S. A comparison of language samples collected in four situations, Language Speech and Hearing Services in the Schools, 1974, 2, 71-78.
- MILLER, J.E. Assessing Language Production in Children: Experimental Procedures, University Park Press, 1981.
- OLSWANG, L.B. AND CARPENTER, R.L. Elicitor effects on the language obtained from young language-impaired children, Journal of Speech and Hearing Disorders, 1973, 43, 76-88.

PRUTTING, C.E., BAGSHAW, N., GOLDSTEIN, H., JUSKOWITZ, S. AND UHEN, I. Clinician-child discourse: some preliminary questions, Journal of Speech and Hearing Research, 1978, 43, 123-139.

SCOTT, C., AND TAYLOR, A. A comparison of home and clinic gathered samples, Journal of Speech and Hearing Disorders, 1978, 43, 482-495.

STRANG, H.R., BRIDGEMAN, B. and CARRICO, M.F. Effects of game versus test definition for third grade children on three subtests of the Weschler Intelligence Scale, Journal of Educational Measurement, 1974, 11, 125-127.

APPENDIX A

Rationale for Subjects Used

Children with normally developing speech and language skills were chosen as the population base of the present study because, in agreement with Scott and Taylor (1978), it was "...reasoned that a first study should look at normal range of syntactic productivity."(p. 483). Three-year-olds, rather than another age group, were chosen for a number of reasons. By using three-year-olds, Mean Length of Utterance (MLU) between 3.0 and 4.7 could be expected, providing a range of complexity (Killer, 1981). Previous studies in the area of free-speech samples have also used children in that general age group. Kramer et al. (1979) used three to five-year-olds with a mean of three years, five months and Olswang and Carpenter (1978) used language-impaired children from three to six years. A third, but equally important, reason for using three-year-olds was their availability since a preliminary survey indicated that there was a greater number of three-year-olds than other age groups enrolled in the daycares selected.

Consistent with previous research (Ickes and Newton, 1980; Kramer et al., 1979; Olswang and Carpenter, 1978; Scott and Taylor, 1978), no attempt was made to screen the mothers for such variables as age, education, socio-economic status or marital status. Criteria for inclusion in the study was that:

1. The child was developing speech and language skills normally, as judged by daycare personnel;
2. The mother volunteered to participate;
3. Both mother and child passed the hearing screening.

APPENDIX B

Subject and Daycare Information

I. Daycares used in the study

	<u>ADDRESS</u>	<u>PHONE</u>
Children's Center	432 E. Pine St.	721-2106
Educare Center	603 Edith St.	542-0552
Little World Center	South and Eaton	543-6156
Playmate Day Care Center	704 Crosby	549-3138
Rocking Horse Ranch	3803 Dore Lane	251-3062

* All daycare centers are located in Missoula, Montana

II. Subjects

<u>Subject Number</u>	<u>Daycare Center</u>	<u>Chronological Age (Year, Month)</u>
1	Educare	3-4
2	Little World	3-10
3	Little World	3-1
4	Rocking Horse	4-0
5	Educare	3-7
6	Playmate	3-11
7	Playmate	3-10
8	Playmate	3-11

Subjects (cont.)

Subject Number	Daycare Center	Chronological Age (Year, Month)
9	Playmate	3-10
10	Educare	3-10
11	Little World	3-3
12	Little World	3-1

APPENDIX C

Instructions for Pure-Tone Hearing Screening

Bilateral pure-tone screening was done in accordance with ASHA (1975) standards, "Bilateral pure-tone screening levels shall be 20 dB HL (re: ANSI-1969) at 1000 Hz and 2000 Hz and 25 dB at 4000 Hz"(p. 96).

Instructions to Mother

"You are going to hear some sounds. When you hear the sound I want you to raise your hand. Lower your hand when the sound goes away."

Instructions to Child

"Now it's your turn to do what Mommy did. It's fun to listen to the beeps. Let's put these on so you can be just like a pilot. When you hear a beep I want you to put your hand up. Let's see how many beeps you can hear." (Conditioning was used as necessary with the children).

APPENDIX D

Instructional Set P

"I would like you to spend about ten minutes playing with your child as you normally would at home. Feel free to use any of the toys in the room. They have been put there to help your child feel more comfortable. If you brought along one of your child's toys you are welcome to take it with you into the room. I will be unable to answer any questions you have until the study is completed. At that time I will be mailing you a written report regarding the results and will be happy to talk to you. Again, you are to spend the next ten minutes playing with your child as you normally would at home."

Instructional Set S

"I would like you to spend about ten minutes interacting with your child in such a way as to give us a clear example of your child's speech and language skills. Feel free to use any of the toys in the room. They have been put there to help your child feel more comfortable. If you brought along one of your child's toys you are welcome to take it with you into the room. I will be unable to answer any questions you have until the study

is completed. At that time I will be mailing you a written report regarding the results and will be happy to talk with you. Again, you are to spend the next ten minutes interacting with your child in such a way as to give a clear example of your child's speech and language skills."

APPENDIX E

Procedure Details

After the thirty-eight children were randomly sequenced using a table of random numbers, twelve children were selected in sequence to participate in the study. Once a subject had been selected the experimenter rechecked with daycare center personnel to ensure that the child was developing speech and language skills normally. The phone number of the child's mother was then obtained from the daycare center and the mother were contacted to elicit their participation. The experimenter described what the study would entail and the time required to participate (see Appendix F). In the event that the second questioning of daycare personnel indicated that the child was not developing speech and language skills normally or that the mother did not agree to participate, the next randomly sequenced child was chosen until twelve mother-child pairs had participated in the study. Twenty-six subjects were selected before twelve had participated in the study. Of these twenty-six subjects, three cancelled or failed to attend the appointment, and eleven refused to participate. If the mother agreed to participate, an appointment time was scheduled at their convenience. Each subject took approximately thirty-five minutes to participate. Subjects were

scheduled a minimum of one hour apart to ensure each mother-child pair was not rushed.

Upon arrival at the clinic the experimenter initiated conversation with the mother-child pair, saying,

"Hello, Mrs. ---- and ----- (child's name). I am glad to see you."

and added any appropriate social comments. The mother-child pair was taken to the room designated for administering the instructional sets where the mother was again given a description of what would be required of her and her child. The mother was then asked to read and sign the Consent Form to participate in the study (see Appendix G). The mother was told,

"You and ----- (child's name) have been chosen to participate in this study because the daycare personnel feel that your child is developing normally. We wish to learn about mother-child interactions in two different situations. It is hoped that this information will be useful in helping parents who have children with problems.

Today you will listen to tape-recorded instructions for the two different situation. It is important that you listen carefully and then do exactly what the instructions say. The interactions between you and your child will be recorded so I can analyze them later. I will not be able to answer any questions you may have about the study until it is over so please listen carefully. Ready? Okay. Here are the instructions." The experimenter continued, "It is very important that you have understood the

instructions you listened to. Please repeat them to me."

Criteria for understanding the instructions included the mother using either the word "play" (instructional set P) or "speech" or "language" (instructional set S) when she reiterated the instructions. If criteria was not met the instructions were repeated using the tape-recorder with the same procedure as the first time. Instructions did not have to be repeated to any of the mothers. Then the mother-child pair was taken to the testing room and told,

"I will signal the end of each recording period. There will be about a five-minute break period between the two situations."

The experimenter went to the observation room for the ten-minute period. After this period the experimenter opened the door and said,

"We're done with the first part of this study. Let's take a break. I have some milk and cookies waiting for you."

The mother-child pair was taken back into the instructional room where milk and cookies had been laid out. The mother-child pair was told,

"I'll be back in five minutes. Please make yourself comfortable and help yourself to the

milk and cookies."

During the break, the experimenter went back to the testing room and placed all the toys back in the same position they had been at the outset of the first experimental condition.

After the break was over, the experimenter entered the instructional room, saying,

"We will now begin with the second half of this study. Again, I would like you to listen to the instructions carefully."

The procedure for the second half of the experiment mimicked the first half. Following the second half of the experiment the mother-child pair were taken back to the instructional room. Screening for hearing was performed on both mother and child according the ASHA (1975) guidelines (Appendix C). All subjects passed the hearing screening. The mother was thanked for her participation and informed that she would receive a written copy of the results, if she desired (Appendix G). The experimenter accompanied the mother-child pair to the door to say good-bye and extend further thanks.

The same procedure was repeated until twelve mother-child pairs meeting the criteria had participated in the study.

APPENDIX F

Introduction to Mothers When Contacted on the Phone

"Hello. My name is Elizabeth Zischka. I am a graduate student at the University of Montana. I am investigating mother-child interaction in two different for my Master's thesis. You and your child have been chosen to participate in this study because the daycare personnel feel that your child is developing normally. Hopefully, this information will be useful in helping parents who have children with problems. Your participation in this study will be greatly appreciated.

To participate in this study I need you and your child to come to the Speech and Hearing Clinic at the University of Montana once for approximately thirty-five minutes. This time can be arranged to fit in with your schedule. I will observe you and your child in the two situations from another room and will use a videotape to analyze the data I collect. The room where the study will take place will have toys for you and your child to play with. You are also encouraged to bring one of your child's favourite toys with you to make him/her feel more comfortable. Do you have any questions you would like to ask me?"

APPENDIX G

Written Consent Form

Thank you for agreeing to participate in this study. The information we obtain will be very useful with children who have problems.

It is important that you know that even though you sign to indicate your permission for you and your child to participate, you are free to withdraw from the study at any time. The information we obtain will be made available to you and your daycare following the completion of this study. No names will be given to the daycare regarding the study.

It is important that you know that no physical injury will occur to either you or your child as a result of this experiment. Federal Regulations insist that we include the following information on our consent form.*

Sincerely,

Elizabeth Zischka

University of Montana

Communication Sciences and Disorders

I have read a description of the study proposed by Elizabeth Zischka. I give permission for my child and myself to participate in the study and understand that I am free to withdraw at any time.

(Date)

(Name of Parent)

*In the event that physical injury results from biomedical or behavioral research the human subject should individually seek appropriate medical treatment and shall be entitled to reimbursement or compensation consistent with the self insurance program for Comprehensive General Liability established by the Department of Administration under authority of Title 32, Chapter 4325, RCM 1947 or by satisfaction of the claim or judgement by the means provided by RCM 1947 Section 32-4325. In the event of a claim for such physical injury further information may be obtained from the University Legal Counsel.

Request for Copy of Results

Thank you very much for your help in this study. The information we have obtained will be very helpful to myself and other people working with children. I cannot tell you the results of the experiment at this time but would be pleased to send you a written copy when the study is completed. You may also phone me at that time and I would be happy to discuss the results of this study with you.

If you would like a summary of the results would you please put your name and address below:

(Name)

(Address)

APPENDIX H

Rationale for Language Measures Used

To ascertain the differential effect of these two instructional sets, language measures which were judged to best reflect the linguistic productivity of both the mother and her child. Language measures used to analyze the mothers' expressive language included: total number of utterances, number of interrogatives, number of declaratives and number of imperative. These measures have all been found useful in previous studies. For example, both Olswang and Carpenter (1978) and Ickes and Newton (1980) concluded that mothers were able to elicit a greater number of utterances from their child than were the clinicians. Olswang and Carpenter also found that mothers used a greater total number of interrogatives about materials present in the immediate environment than did clinicians. The present author was further interested in whether a difference between total number of interrogatives as well as just interrogatives about materials present would be observed as a function of the two instructional sets. Likewise, Olswang and Carpenter found that clinicians made more comments about materials present in the immediate environment than mothers. The present study examined

both declaratives and imperatives used as a function of instructional set.

The language measures chosen to analyze the childrens' verbal output were: total number of utterances and Mean Length of Utterance (MLU). As mentioned above, previous literature (Ickes and Newton, 1980; Olswang and Carpenter, 1978) has indicated that children talk more with their mothers than with clinicians. MLU has been shown to be a useful index of increasing linguistic complexity up to approximately four years of age (Cazden, 1972) and "...has been shown to increase with age up to MLU of 4.0-4.50"(Miller, 1981, p. 75). The popularity of using this measure to examine the expressive language of children is exemplified in the proliferation of research. MLU has been examined with regard to stimulus, situation and listener-elicitor in relation to other variables (Cowan, Hoddinott, Weber and Klein, 1967). Recent research by Kramer et al. (1979) has concluded that children had a longer MLU in the home than in the clinic. In summary, the previous research on MLU and total number of utterances provides rationale for using these measures in the present study.

APPENDIX I

Guidelines Used to Calculate an Utterance

An utterance was defined as "a unit of spoken language preceded or followed by a perceived pause or terminated by some change in inflection (rising or falling intonation)". (Olswang and Carpenter, 1978).

The following additions were used to calculate an utterance:

1. Semantic acknowledgement (i.e., yes, no, uh-huh and oh) were included.
2. Sounds used such as animal or vehicle sounds were included. For example, if the child said 'vroom' while playing with a truck, this was counted as an utterance.
3. Counting on the part of either the child or mother was counted as one utterance.

4. Utterances that were interrupted were counted as an utterance.
5. Language formulation instances were counted as an utterance.
6. Frequent routines (counting, alphabet, nursery rhymes, song fragments and commercial jingles) (Miller, 1981) were counted as one utterance.
7. Unintelligible utterances were counted.

Guidelines for Calculating Number of Interrogatives
About Materials Present

Interrogatives about materials present were defined as those questions, on the part of the mother, that specifically asked for information regarding an object in the room. This included questions of the form: "what's this, who is this, what are those for?"

Guidelines for Calculating Total Number
of Interrogatives

The questions the mothers in the study asked, including:

1. Wh- questions (including who, which, what, how, where and why).
2. Tag questions (e.g., "you're cooking, aren't you?").
3. Questions formed by inverting the complete subject noun phrase and the first element of the auxiliary verb (e.g., "you'll be the mother?").
4. Questions indicated by a rise in intonation.

Guidelines for Computing MLU

The first fifty consecutive utterances starting at the end of the first three minutes were used to calculate MLU. Brown's (1973) procedure was used to calculate MLUs with the following additions:

1. Frequent routines (counting, alphabet, nursery rhymes, song fragments and commercial jingles) were not included. "If there are frequent longer (or shorter) utterances that are recitations based on memory or picture content, the MLU

may be biased by the inclusion of these utterances."(Miller, 1981, p. 25). Although Miller recommends computing the MLUs both including and excluding those utterances, this study was investigating the instructional set and all frequent routines were not included.

2. Only one "and" per utterance was allowed for MLU purposes (e.g. "I want that ball and then I will play."). The entire utterance was calculated for MLU but "No 'cause it goes up to my nose and then goes like this and then breathe in like that" was counted as one utterance for the utterance count but for MLU calculation was counted as two utterances; "and then breathe in like that" was the second utterance.
3. All interrupted and unintelligible, or partially unintelligible, utterances were not included for MLU.
4. Speech repetitions within an utterance were not included ; e.g., "I want I want this one" counts as "I want this one" for MLU calculation.

5. Semantic acknowledgements such as uh-huh, hmm, were not included.
6. Fillers such as mmm, oh, uh, were not included.
7. Ritualized names (Cookie Monster, Big Bird, Mr. Hooper, Sesame Street), ritualized words (merry-go-round, ice cream, teddy bear and doll house) and ritualized greetings (thank you, good morning, you're welcome, thanks) counted as one.
8. Repeated animal sounds or other descriptive sounds were counted as one.

APPENDIX J

ANOVA SOURCE TABLES FOR MOTHERS' MEASURES

1. Interrogatives

Source	Sum of Squares	df	Mean Square	F ratio	Prob.
Total	3896.00	23			
Between Subjects	2266.00	11			
Group (I x O)	384.00	1	384.00	2.04	ns
Error b	1882.00	10	488.20		
Within Subjects	1630.00	12			
Instruction(I)	580.17	1	580.17	5.55	<.05
Order(O)	4.17	1	4.17	.04	ns
Error w	1045.60	10	104.56		

2. Interrogatives about Materials Present in Immediate Environment

Source	Sum of Squares	df	Mean Square	F ratio	Prob.
Total	1820.63	23			
Between Subjects	758.13	11			
Group (Ix0)	2.01	1	2.01	.03	ns
Error b	756.09	10	75.61		
Within Subjects	1820.63	12			
Instruction(I)	35.02	1	35.02	.48	ns
Order(O)	301.02	1	301.02	4.14	ns
Error w	726.41	10	72.64		

3. Total Utterances per Minute

Source	Sum of Squares	df	Mean Square	F ratio	Prob.
Total	359.42	23			
Between Subjects	32.48	11			
Group (Ix0)	6.30	1	6.30	2.41	ns
Error b	26.18	10	2.17		
Within Subjects	326.94	12			
Instruction(I)	1.87	1	1.87	.06	ns
Order(O)	4.62	1	4.62	.14	ns
Error w	320.45	10	32.04		

4. Declaratives

Source	Sum of Squares	df	Mean Square	F ratio	Prob.
Total	597119.83	23			
Between Subjects	1685.83	11			
Group (Ix0)	433.63	1	433.63	3.46	ns
Error b	1252.20	10	125.22		
Within Subjects	595434.00	12			
Instruction(I)	521.91	1	521.91	.00	ns
Order(O)	32.58	1	32.58	.00	ns
Error w	595400.98	10	59540.00		

5. Imperatives

Source	Sum of Squares	df	Mean Square	F ratio	Prob.
Total	595.83	23			
Between Subjects	417.33	11			
Group (Ix0)	.16	1	.16	.00	ns
Error b	417.17	10	41.72		
Within Subjects	178.50	12			
Instruction(I)	1.53	1	1.53	.09	ns
Order(O)	13.53	1	13.53	.83	ns
Error w	163.44	10	16.34		

APPENDIX K

RAW DATA FOR MOTHERS' MEASURES

A. Order 1: Play--Speech/Language

1. Total Utterances

Instruction	SUBJECT #					
	1	3	5	7	9	11
P01	13.25	19	18	17.75	12	20.50
S02	11.84	19	14	22	10	21.75

2. Imperatives

Instruction	SUBJECT #					
	1	3	5	7	9	11
P01	3	3	3	17	4	3
S02	1	2	5	7	5	2

3. Declaratives

Instruction	SUBJECT #					
	1	3	5	7	9	11
P01	58	34	51	38	54	61
S02	63	30	46	46	35	34

4. Interrogatives about Materials Present

Instruction	SUBJECT #					
	1	3	5	7	9	11
P01	5	7	32	5	10	8
S02	1	13	12	3	12	0

5. Imperatives

Instruction	SUBJECT #					
	1	3	5	7	9	11
P01	36	61	36	39	42	29
S02	33	64	41	40	57	62

B. Order 2: Speech/Language--Play

1. Total Utterances

Instruction	SUBJECT #					
	2	4	6	8	10	12
P02	14.75	12	20.70	20.50	18.43	15
S01	17.80	11.50	24.50	17	18.20	21

2. Imperatives

Instruction	SUBJECT #					
	2	4	6	8	10	12
PO2	1	4	4	1	7	8
S01	4	4	0	2	22	5

3. Declaratives

Instruction	SUBJECT #					
	2	4	6	8	10	12
PO2	61	46	67	67	56	64
S01	63	45	52	42	55	64

4. Interrogatives about Materials Present

Instruction	SUBJECT #					
	2	4	6	8	10	12
PO2	3	17	5	1	2	34
S01	8	10	16	10	6	0

5. Imperatives

Instruction	SUBJECT #					
	2	4	6	8	10	12
PO2	20	52	27	28	33	30
S01	30	46	42	54	24	58

APPENDIX L

ANOVA SOURCE TABLES FOR CHILDREN'S MEASURES

1. Total Utterances per Minute

Source	Sum of Squares	df	Mean Square	F ratio	Prob.
Total	213.81	23			
Between Subjects	166.62	11			
Group (I x O)	3.71	1	3.71	.23	ns
Error b	162.91	10	16.29		
Within Subjects	46.19	12			
Instruction(I)	1.58	1	1.58	.44	ns
Order(O)	9.08	1	9.08	2.56	ns
Error w	35.53	10	3.55		

2. MLU Scores

Source	Sum of Squares	df	Mean Square	F ratio	Prob.
Total	10.80	23			
Between Subjects	8.56	11			
Group (I x O)	.03	1	.03	.04	ns
Error b	8.53	10	.85		
Within Subjects	2.24	12			
Instruction(I)	.42	1	.42	5.55	<.05
Order(O)	.05	1	.05	.28	ns
Error w	1.77	10	.17		

APPENDIX M

RAW DATA FOR CHILDREN'S LANGUAGE

A. Order 1: Play--Speech/Language

1. Mean Length of Utterance

Instruction	SUBJECT #					
	1	3	5	7	9	11
PO1	3.28	2.86	3.22	2.92	3.76	3.86
S02	3.72	2.92	3.26	3.76	3.86	4.50

2. Total Utterances

Instruction	SUBJECT #					
	1	3	5	7	9	11
PO1	6.50	10	14.75	13.50	13.50	15.25
S02	9	12.50	15	17.50	13.75	15

B. Order 2: Speech/Language--Play

2. Mean Length of Utterance

Instruction	SUBJECT #					
	2	4	6	8	10	12
PO2	3.56	3.46	4.10	4.02	2.26	2.62
S01	3.34	5.04	3.40	4.28	2.28	2.78

2. Total Utterances

Instruction	SUBJECT #					
	2	4	6	8	10	12
PO2	12.75	15.25	11.20	12.50	7.71	16.75
SO1	10.60	8.40	12.50	11	10.40	17.75

APPENDIX N

ANOVA Source Tables for MLU Groupings
According to Distributional Analysis

1. Utterances with an MLU of One

Source	Sum of Squares	df	Mean Square	F ratio	Prob.
Total	321.30	23			
Between Subjects	208.30	11			
Group (Ix0)	4.14	1	4.14	.20	ns
Error b	204.16	10	20.42		
Within Subjects	113.00	12			
Instruction(I)	20.40	1	20.40	2.96	ns
Order(O)	23.97	1	23.97	3.47	ns
Error w	68.89	10	6.89		

2. Utterances with an MLU of Two, Three, Four, or Five

Source	Sum of Squares	df	Mean Square	F ratio	Prob.
Total	466.00	23			
Between Subjects	168.50	11			
Group (Ix0)	15.08	1	15.08	.98	ns
Error b	153.42	10	15.34		
Within Subjects	297.50	12			
Instruction(I)	.08	1	.08	.00	ns
Order(0)	100.80	1	100.80	5.07	<.05
Error w	197.34	10	19.73		

3. Utterances with an MLU of Six, Seven, or more than Seven

Source	Sum of Squares	df	Mean Square	F ratio	Prob.
Total	753.96	23			
Between Subjects	545.46	11			
Group (Ix0)	20.66	1	20.66	.40	ns
Error b	524.80	10	52.48		
Within Subjects	208.50	12			
Instruction(I)	7.04	1	7.04	.35	ns
Order(0)	1.05	1	1.05	.05	ns
Error w	200.40	10	20.04		

APPENDIX O

ANOVA SOURCE TABLES FOR SEPARATE ANALYSIS OF UTTERANCE
LENGTHS WITH AN MLU OF TWO,
THREE, FOUR, AND FIVE

1. Two

Source	Sum of Squares	df	Mean Square	F ratio	Prob.
Total	89.83	23			
Between Subjects	51.83	11			
Group (Ix0)	5.16	1	5.16	1.69	ns
Error b	43.70	10	4.37		
Within Subjects	38.00	12			
Instruction(I)	4.16	1	4.16	.05	ns
Order(0)	.16	1	.16	.05	ns
Error w	33.67	10	3.37		

2. Three

Source	Sum of Squares	df	Mean Square	F ratio	Prob.
Total	318.96	23			
Between Subjects	216.46	11			
Group (Ix0)	40.04	1	40.04	2.27	ns
Error b	176.42	10	17.64		
Within Subjects	105.50	12			
Instruction(I)	.38	1	.38	.04	ns
Order(O)	.04	1	.04	.00	ns
Error w	102.09	10	10.21		

3. Four

Source	Sum of Squares	df	Mean Square	F ratio	Prob.
Total	128.00	23			
Between Subjects	83.50	11			
Group (Ix0)	.42	1	.42	.05	ns
Error b	83.03	10	8.31		
Within Subjects	44.50	12			
Instruction(I)	5.04	1	5.04	2.06	ns
Order(O)	15.04	1	15.04	6.16	<.05
Error w	24.42	10	2.44		

4. Five

Source	Sum of Squares	df	Mean Square	F ratio	Prob.
Total	213.30	23			
Between Subjects	90.30	11			
Group (I x O)	1.47	1	1.47	.18	ns
Error b	88.83	10	8.88		
Within Subjects	123.00	12			
Instruction(I)	1.47	1	1.47	.16	ns
Order(O)	32.64	1	32.64	3.70	ns
Error w	88.89	10	8.89		

APPENDIX P

RAW DATA ON MEAN UTTERANCE LENGTH

A. Order 1: Play--Speech/Language

1. One

Instruction	SUBJECT #					
	1	3	5	7	9	11
P01	17	18	18	19	14	17
S02	19	19	17	14	16	19

2. Two

Instruction	SUBJECT #					
	1	3	5	7	9	11
P01	5	7	3	5	7	1
S02	5	10	6	4	2	5

3. Three

Instruction	SUBJECT #					
	1	3	5	7	9	11
P01	5	5	7	10	1	7
S02	5	7	7	5	5	4

4. Four

Instruction	SUBJECT #					
	1	3	5	7	9	11
PO1	9	11	9	6	10	4
S02	6	6	8	6	7	1

5. Five

Instruction	SUBJECT #					
	1	3	5	7	9	11
PO1	8	5	4	4	12	10
S02	1	1	6	11	6	2

6. Six

Instruction	SUBJECT #					
	1	3	5	7	9	11
PO1	1	2	5	2	3	4
S02	5	4	4	5	5	2

7. Seven

Instruction	SUBJECT #					
	1	3	5	7	9	11
PO1	3	1	2	3	4	2
S02	2	0	1	1	4	5

8. Eight

Instruction	1	3	5	7	9	11
PO1	2	1	2	1	4	5
S02	7	3	1	4	5	12

B. Order 2: Speech/Language--Play

1. One

Instruction	2	4	6	8	10	12
PO2	20	16	15	16	22	21
S01	13	7	15	9	22	21

2. Two

Instruction	2	4	6	8	10	12
PO2	4	3	3	3	3	4
S01	5	2	4	3	6	6

3. Three

Instruction	2	4	6	8	10	12
PO2	2	10	6	5	16	11
SO1	9	5	9	7	16	3

4. Four

Instruction	2	4	6	8	10	12
PO2	7	4	4	6	8	9
SO1	3	7	8	5	3	9

5. Five

Instruction	2	4	6	8	10	12
PO2	3	7	7	6	1	3
SO1	7	9	8	10	2	8

6. Six

Instruction	SUBJECT #					
	2	4	6	8	10	12
PO2	6	4	6	9	0	0
SO1	1	5	1	6	0	2

7. Seven

Instruction	SUBJECT #					
	2	4	6	8	10	12
PO2	4	4	3	0	0	2
SO1	0	7	2	4	1	0

8. Eight

Instruction	SUBJECT #					
	2	4	6	8	10	12
PO2	4	2	6	5	0	1
SO1	5	8	3	5	0	1

APPENDIX Q

This appendix contains data on the nine subjects requiring longer than four minutes to exhibit fifty utterances.

Instructional Set	Order	Utterances/minute
<u>P</u>	1	50/5
<u>P</u>	1	52/8
<u>P</u>	2	54/7
<u>P</u>	2	50/4.5
<u>S</u>	1	52/5
<u>S</u>	1	55/5
<u>S</u>	1	50/6
<u>S</u>	1	53/5
<u>S</u>	2	54/6