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THE INFLUENCE OF DIALECT DIFFERENCES ON THE IMMEDIATE RECALL OF VERBAL MESSAGES.

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THE PURPOSE OF THIS STUDY WAS TO INVESTIGATE THE INFLUENCE OF PHONETIC, SYNTACTIC, AND SEMANTIC DIALECT DIFFERENCES ON COMMUNICATION BETWEEN PERSONS FROM DIFFERENT DIALECT COMMUNITIES. THE THREE HYPOTHESES UPON WHICH THE STUDY WAS BASED STATED THAT PHONETIC, SYNTACTIC, AND SEMANTIC FEATURES OF DIALECT DIFFERENCES WOULD EACH CONTRIBUTE TO RESTRICTIONS ON THE AMOUNT OF INFORMATION TRANSMITTED BETWEEN MEMBERS OF DIFFERENT DIALECTS. RACE, SOCIAL CLASS, AND PLACE OF BIRTH WERE THE PRIMARY INDICES USED TO SELECT A GROUP OF ADULTS AND CHILDREN FROM EACH OF TWO DIALECT POPULATIONS IN THE DETROIT METROPOLITAN AREA. LANGUAGE SAMPLES WERE OBTAINED FROM BOTH GROUPS OF ADULTS. THESE SAMPLES SERVED AS STIMULUS MATERIALS FOR AN IMMEDIATE RECALL TASK WITH THE TWO GROUPS OF CHILDREN. EACH STIMULUS LIST WAS PRESENTED BY TWO SPEAKERS FROM EACH OF THE DIALECT GROUPS TO EACH SUBJECT. EACH STIMULUS PRESENTATION WAS DEFINED BY THREE FACTORS--THE SPEAKER, THE SOURCE FROM WHICH IT WAS COLLECTED, AND ITS APPROXIMATION-TO-ENGLISH-WORD-ORDER. THE EFFECT OF PHONETIC DIFFERENCES WAS SIGNIFICANT FOR THE WHITE MIDDLE-CLASS GROUP BUT NOT FOR THE NEGRO LOWER SOCIAL CLASS GROUP, WHILE THE EFFECTS OF SOURCE DIFFERENCES WERE NOT CLEARLY OBSERVABLE IN THE DATA. THIS DISSERTATION APPEARS IN "SUPPLEMENT TO STUDIES IN LANGUAGE AND LANGUAGE BEHAVIOR, PROGRESS REPORT V," SEPTEMBER 1, 1967. (AUTHOR/AMM)

THE UNIVERSITY OF MICHIGAN

Studies in Language and Language Behavior

The Influence of Dialect Differences on the Immediate Recall of Verbal Messages

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The Influence of Dialect Differences on the Immediate Recall of Verbal Messages

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The purpose of this study was to investigate the influence of phonetic, syntactic, and semantic dialect differences on communication between persons from different dialect communities. It was argued that (1) dialects are defined in terms of distributional differences in the frequency and structure of their phonetic and semantic elements, and that (2) a person's ability to process natural language is directly related to the degree to which the features of a message match the distributional differences in the frequency and structure of their phonetic and semantic elements, and that (3) a person's ability to process natural language is directly related to the degree to which the features of a message match the distributional features of his own dialect. The 3 hypotheses stated that phonetic, syntactic, and semantic features of dialect differences would each contribute to restrictions on the amount of information transmitted between members of different dialects.

Race, social class, and place of birth were the primary indices used to select a group of adults and children from each of 2 dialect populations in the Detroit metropolitan area. The group labeled LSC were Negro, lower social class, and born in the South. The MSC group were Caucasian, middle social class, and born in the East or Midwest. 15 women, aged 25-40, comprised the adult groups; 24 first grade children between 75-87 months of age made up the groups of children.

Language samples at 3 approximations-to-English-word-order were obtained from both groups of adults. These samples served as stimulus materials for an immediate recall task with the two groups of children. Each stimulus list was presented by 2 speakers from each of the dialect groups to each S. Each stimulus presentation was defined by 3 factors: (a) the speaker; (b) the source from which it was collected; and (c) its approximation-to-English-word-order.

The effect of phonetic differences, predicted in Hypothesis 1, was significant for the MSC group but not for the LSC group of Ss. MSC Ss remembered less of the lists which were presented by the LSC speakers, but there was no significant difference in the recall of the LSC Ss on lists presented by MSC and LSC speakers. It was concluded that the exposure of the LSC Ss to MSC dialects through school and the mass media had developed their facility to perceive messages in this dialect, and thus prevented a decrement in performance on the MSC-presented lists. Those concerned with the study of subcultural dialects were cautioned by this data not to make inferences about the decoding abilities of the dialect speaker from the phonetic descriptions of the speaker's verbal output.

The effects of source differences, predicted in Hypotheses 2 and 3, were not clearly observable in the data. Both groups did remember more words from lists which were collected from their home source, producing a nonsignificant trend in the hypothesized direction. 2 aspects of the experimental design worked against the support of Hypotheses 2 and 3. The adult women who supplied the LSC lists were a middle class biased sample of the community, and the method of collecting language samples elicited a formal style of speech.

2 findings not directly related to the hypotheses seem worthy of further investigation. First, a significant group by task level interaction resulted from a decreasing difference in recall performance between MSC and LSC groups as the structure of the stimulus lists increased. The increased "meaning" of the higher-order lists seemed to benefit the LSC Ss more than the MSC Ss. Second, a striking difference in the serial position learning curve was observed for the 2 groups. This finding could contribute to a description of the differences between the learning paradigms utilized by these 2 educational groups.

Footnote

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CHAPTER I

STATEMENT OF THE PROBLEM

The study of language differences within political or geographic boundaries has traditionally been the concern of the linguists and anthropologists. However, within the last ten years, many behavioral scientists have focused their research and theorizing on the role of language in the psycho-social processes. Sociologists have increased their interest in language behavior as the evidence mounts for a strong relationship between the features of a person's language system and indices of social success. Psychologists are becoming increasingly aware of the pervasive influence of language on the basic psychological processes which are used to describe human behavior. Educators are particularly concerned with the results of research on language differences because they relate so significantly to the central educational function of interpersonal communication.

It is the purpose of the present research to investigate the effects of communicating in different social dialects by devising experimental settings in which children respond to messages presented in both their home dialect and another social dialect.

Sources of Language Variation

Patterns of language use within a society are related to a number of factors, including social class, religion, ethnic group, and geographical

region. Many of the language differences observed within a community cannot easily be classified because the important determinants of language vary continuously rather than discretely. Language differences must often be defined in terms of statistical, rather than absolute, criteria. But, nevertheless, statements of general applicability can be made about the linguistic correlates of several non-linguistic factors. The term, dialect, is used to identify linguistically defined language differences which are associated with non-linguistic factors, e.g., regional dialects are associated with geographical regions, ethnic dialects are associated with a group's race and nationality, social class dialects are defined by differences in the occupational status, wealth, and prestige of its users.

Language differences, which are labeled "dialect" differences, should be considered in the light of other forms of language variation. First, every person has a unique language system because of the complexity and continuity of the variables which determine an individual's language system. The term <u>ideolect</u>, is used to refer to the features which uniquely distinguish an individual's language system. When a group of people, having a specific non-linguistic descriptor in common, also have features of their language system which distinguish it from other closely associated groups of people, those language differences define a dialect. A second, non-dialect source of language variation is the within-person variation which is associated with different social settings. The descriptive features of a person's language vary depending on his perceptions of the social setting and the social prestige of the listeners. These variations are referred to as <u>styles</u>. Both ideolects and styles must be considered in any discussion of the effects of dialect differences.

The dynamics by which dialect differences perpetuate themselves are not all clearly understood. If two groups are isolated for geographic or social reasons, the languages of those two groups will progressively diverge (Sapir, 1949, p. 150). Other things being equal, the amount of interaction between two groups is related to the extent of language variation between those groups. However, this does not account for all of the dialect variation present within a language community. Dialect differences seem to be perpetuated because they serve to mark and reinforce other non-linguistic differences which are important to members of human societies. Throughout history, the social prestige hierarchy of a society has been marked by distinctive linguistic features. These markers persist even in cases where there exists a great deal of interaction among the different levels within the social hierarchy. There are indications that language differences help individuals fulfill a psychological need to identify themselves with a particular social subgroup.

It should be clear from this discussion that no dialect can be precisely defined. There is, of course, no single dialect which is spoken by all members of the lower social class in the United States. Likewise, there is no single United States dialect which is uniquely identified with all Negroes. The influences acting on the language of any large group of people such as the lower social class or Negroes, are so diverse that no distinguishing feature can be singled out which every member has in common. Any classification of dialects is necessarily arbitrary, and the validity of any classification can only be judged on the basis of some external, pragmatic criterion. The subsequent labeling of dialects in this, and any research, must be interpreted in terms of the specific social and linguistic factors which define the individuals and their language.

Language Differences in Educational Settings

The communication problem which results from different dialects within a given educational setting is the general issue with which this research is concerned. Dialects associated with social class and ethnic group are of primary concern in this research, because these variants are the major source of language variation within a classroom.

The study of language differences is educationally relevant not only because these differences relate directly to the communication function of the schools, but also because language plays a crucial role in the psychological development of children. Language is used by humans to serve a symbolic, mediating function in processing information from the environment. Words and word structure are used to represent aspects of the environment, and these language elements are then used in the higher mental processes to build up logical representations of reality. Recent studies of language functioning illustrate that even in young children (5-6 years old) internal language controls and modifies behavior to a great extent (Luria, 1961).

Measures of social class, school achievement, and language skills have repeatedly been shown to be highly related. Children from lower social class homes or minority ethnic groups usually speak a distinctive dialect form, and display retarded development on measures of language skills and general cognitive functioning (McCarthy, 1954; Cazden, 1966). The possibility that language skills may determine to a great extent the capacities represented in school achievement and IQ measures is becoming increasingly plausible.

It seems then that children speaking dialects which differ significantly from the dominant dialect used by teachers and teaching

materials have incurred a double debt. First, these children are handicapped because the language system of the school is different from that which has been learned at home. This handicap can result in ineffective communication as well as ostracization because of the social stigma attached to their dialect. Second, the features of their non-standard dialect leave them ill-equipped to cope with the abstract concepts which are emphasized in schools. This inability to utilize the mediating function of language can result from the lack of appropriate words and word structures or a learned orientation toward the use of language in dealing with the environment. It is the purpose of this research to deal primarily with the first of these language related problems. Both problems could, of course, stem from the same source. That is, the features of the child's language system which prevent him from effectively communicating in the school community, may also restrict his psychological development because of the lack of an adequate verbal representational system.

Language Differences and Information Processing

This research proposes to discuss dialects and dialect differences in terms of their structural features as described by concepts from information theory. The process of learning a language is described in information theory concepts as the grouping and organizing of the elements of language into units, and then organizing these units into progressively larger units. Within a given language, only a limited number of phonemes are used, and these are used only in certain combinations. The child utters phonemic units in a rather random pattern in the very early stages of language development, but later, through

selective reinforcement, only a limited number of the phonemes and phoneme combinations are retained. At the sentence level, a similar process takes place in which the child learns that only a limited number of word orders are permissible within English syntax.

Reducing the number of possibilities in a learning task is equivalent to reducing the information in that task. As a child learns the patterns of language through experience, the amount of information in a task is reduced through the structuring process which Miller refers to as "recoding.' In this process, the units of speech are "organized by learning patterns, and as these larger chunks emerge the amount of message that the operator can remember increases correspondingly." (Miller, 1956, p. 93)

Simplifying techniques, such as this process of recoding, are needed because the information processing abilities of humans are dependent on rather inflexible input limitations (Miller, 1956; Broadbent, 1958). Humans increase their capacity to deal with information not so much by increasing their immediate memory span as by recoding and condensing many smaller units into fewer larger units. The patterned regularity of the spoken language facilitates this recoding process and increases a person's capacity to deal with verbal messages.

The structural patterns of a linguistic system describe the regularities with which phonemes, morphemes, and words are combined in connected discourse. The phonemes in any given language system combine sequentially in very limited ways. For example, the phoneme /p/ can be followed by only a limited set of other phonemes, and cannot be followed within the same syllable by /b/, /d/, /f/, /g/, and a number of other

consonant sounds. Within the set of phonemes which can follow /p/, the proportion of times that each follows /p/ is different. These combinatorial patterns, or contextual constraints, are learned, and facilitate subsequent word learning which preserves these patterns, but inhibits learning which violates these patterns (Miller, Bruner, and Postman, 1954).

Similarly, words are combined to produce phrases and sentences in only a limited number of patterns. The process by which these syntactic patterns are learned includes the grouping of words into conceptual categories, roughly equivalent to the grammatical "parts-of-speech." At the word level, only a limited number of words can follow the word "green," and of this set of possible words some are more probable than others. In terms of conceptual classes of words, only a noun or another adjective can follow "green" in order to obey the syntactic rules of English. It has been repeatedly demonstrated that these syntactic rules and the contextual constraints among words affect a person's performance on tasks involving natural language structure (Garner, 1962; Miller, 1962). Again, these learned patterns of inter-word structure facilitate the learning of strings of words which exhibit these patterns, but inhibits the learning of word sequences which do not obey these learned rules.

Dialects differ in at least one of the three linguistic levels: semantics, grammar or phonetics. At the semantic level, a dialect may have words which are entirely unique or which differ in meaning from the words of another dialect. At the grammatical level, word forms may be constructed using different morphological rules. These structural differences between dialects may result from either unique forms or

different expected probabilities of the same forms. Likewise, at the phonetic level the two dialects may be distinguished by different distributions of the same phonemes or by different phonemes.

At all linguistic levels, the contextual constraints among the units within a dialect differ by varying degrees from the constraints within another dialect. According to an information-theory model like Miller's (1956) or an associationistic learning model such as Osgood's (1957, 1963), the learning of within- and between-word constraints or redundancies increases the size of the units which can be remembered, processed, and recalled. In general, when the speaker of one dialect must process a verbal string from another dialect, the redundancy in that message is less for him than for a speaker of the dialect in which the string was presented. Or, since redundancy is inversely related to amount of information, the information in that task is greater for him than if it were presented in his own dialect.

Summary

In summary, the ability to recall a verbal message is influenced by (1) the frequency of the subject's (S's) previous exposure to the elements of the message, and (2) the frequency of the S's previous exposure to the arrangement of the elements within the message. When a child is exposed to some dialect other than his home dialect, the task of information input becomes more difficult because the phonetic, syntactic, and semantic features of that dialect are less familiar to him. This describes the situation which many children face when they attend school. Most children from lower social class (LSC) homes, particularly

those from minority ethnic groups, have learned a non-standard dialect at home, and are taught in the school by a teacher speaking a different dialect. The present research investigates the influence of dialect differences on a specific aspect of cognitive functioning in an experimental setting.

CHAPTER II

REVIEW OF LITERATURE

Introduction

The literature review will parallel the development of the problem as it was presented in Chapter I. First, the literature which describes language differences among social groups will be reviewed. This literature is based upon research in linguistics, which provides an objective description of language differences; sociology, which is concerned with the covariation among language and other features which distinguish social groups; and psychology, which studies language differences as they relate to psychological processes. Second, the literature relating language differences to educational issues will be reviewed. Descriptive literature relating social class, language skills, school achievement, and measured intelligence will be reviewed, and, even more important, the research which studies the dynamic relationships among these factors will be considered. Third, the literature which studies the relationship between different features of a linguistic message and the ability to process that message will be reviewed. The variables which determine the ability to recall a verbal message are of particular importance. These variables are (1) the memory span of the listener, (2) the familiarity of the listener with the elements of the message, and (3) the familiarity of the listener with the structural, or inter-element, features of the message.

Subcultural Language Differences

Subcultural differences in language facility have been reported in many studies. McCarthy (1954) summarizes the research on language differences among groups with different occupations. She concluded, "In all these studies occupational group differences are consistent and strikingly in favor of the upper socio-economic levels in all types of analysis." (p. 587) A more recent summary by Cazden (1966) reports on over 100 studies of language differences at all linguistic levels. Some of these studies make qualitative comparisons among social and ethnic groups; other more descriptive studies describe the quantitative differences among different groups. In regard to the developmental studies, Cazden's summary statement echos McCarthy. "On all the measures, in all the studies, children of upper socio-economic status, however defined, are more advanced than those of lower socio-economic status." (p. 191)

Irwin (1948a, 1948b) reported different developmental trends in the establishment of the phonetic system in children from different occupational groups. The high status group of children used a larger number of sound types and tokens in the 18-30 month age period.

Labov (1964) specifies at least five phonetic indices which distinguish between social classes in New York City. The frequency and extent of these social class phonetic indices depends on the social setting; that is, there are stylistic, intra-person, differences as well as inter-person differences in speech patterns. He also discusses the extent of awareness of prestige speech forms among speakers of different social dialects.

Templin's book (1957) is a developmental description of phonetic, syntactic and vocabulary growth in 3-8 year old children, including a

summary of social class differences on several measures of language development. Other studies (Anastasi and D'Angelo, 1952; Thomas, 1962; Loban, 1963; Weener, 1965) report social class differences in sentence structure and vocabulary, with the middle class subjects showing longer, more complex sentences and a larger vocabulary. Lesser (1965) looked at vocabulary among Jewish, Negro, Chinese, and Puerto Rican children in New York City and found qualitative differences in that respective order.

The basic linguistic issues involved in the study of Negro speech are summarized by McDavid (1951). The historical origins of Negro speech patterns are discussed, and past misconceptions regarding the relationship between Negro speech patterns and physical or personality traits are reviewed. However, no systematic data regarding the distinguishing quantitative features of the Negro dialect are presented.

Pederson's (1964) work compared structural features of indigenous and immigrant Chicago Negroes. He reports differences between the speech patterns of the Negro groups as well as between the Negro groups and the standard Caucasian speech of that area. Phonetic, lexical, and verb form differences are reported.

Stewart (1964) writes about two different dialects within the Negro community of Washington, D.C. Vowel usage, postvocalic /r/, and auxiliary verb forms are the most frequent sources of features which distinguish between social class dialects.

Lane et al. (1967) reports a preliminary phonemic analysis cf perceptual errors made by Southern Caucasian and Negro students. Five phonemic substitutions appeared in the speech of both Negro and Caucasian

speakers as they repeated fifty words presented by native speakers of General American English; a sixth substitution occurred only in the speech of Negroes. The five substitutions involved the following vowel confusions: (1) /iy/ and /ey/, (2) /ɛ/ and /æ/, (3) vowel and h + vowel, (4) /ɔ/ and /a/, (5) /æ / and /i/ before nasals. The sixth confusion made only by Negro Ss was between /f/ and /θ/.

The above research indicates that Negro and lower social class status are often associated with linguistic features which distinguish their speech from the speech of the middle class, Caucasians of the same geographic area. The psychological implications of these language differences for educational settings is the focus of the subsequent literature review and research.

Language Differences and School Performance

The underachievement of school children from minority groups and the lower social class is well documented. On all measures of intelligence and achievement, ethnic group and social class are powerful predictors. Since most members of minority ethnic groups also are members of the lower social class, information about the academic performance of minority groups also provides information about social class differences. Language differences parallel social class and ethnic group differences as well as achievement differences. The purpose of this literature review and the research to be reported is to argue that the language differences are in part responsible for the achievement differences.

Some of the first work done in cultural differences in intelligence concerned Negro-White comparisons (Klineberg, 1935a, 1935b).

He reported the results of testing during World War I and summarized the post-war studies relating to Negro-White differences in IQ. Combining the studies, he reports an average IQ of 86.3 for Northern Negroes and 79.6 for Southern Negroes (1935a, p. 3). The most extensive research in this field was done by Eels, Davis and Havighurst at the University of Chicago in the 1945-1952 period. Davis (1948) reported that on the Otis Beta IQ test, seventy-three of the eighty items on the test showed highly significant differences between the performances of children from two different social levels. Eels et al. (1951) reported correlations between several IQ test scores and social status ranging from .20 to .43 based on sample sizes of over 2,000. They also reported that 9-10 year old lower status children obtained IQ scores which were 17-18 points below their high status counterparts, and with older children the difference increased to 22-23 points. On all cognitive measures the low status group scored lower than the high status group.

Deutsch (1960) compared a Negro and White sample of fourth, fifth, and sixth grade children from similar lower socio-economic levels. He found significant Negro-White differences on the Stanford Achievement test. The mean score of the Negro group represented about a two-year deficit when compared to national norms; the white group showed about a one-year deficit. The deficit for the Negro group increased with more schooling, with a net gain of less than one month in achievement during one school year.

A study (Moriber, 1961) of the IQ performance of third grade children in the New York City school system showed a mean score of 86.7 for

Puerto Rican children, 90.8 for Negro children and 104.0 for "other" children. Scores for comparable sixth grade samples were lower for the Puerto Rican and Negro children, but higher for the "other" children.

Much research and theoretical speculation has been done regarding the dynamics of the relationship between language skills and general cognitive abilities as they relate to social class differences. The explanation most frequently given is that lower social class homes place a lesser emphasis on the kinds of linguistic skills required for success in the schools. As a result of their paucity of language experiences, the LSC children perform poorly on measures of intelligence and school achievement (Bernstein, 1960; Deutsch, 1960; Riessman, 1962).

The conceptual and operational overlap between measures of intelligence and language facility cannot be denied. Almost without exception, the research dealing with intelligence differences points out the crucial role of language skills in the assessment procedures. Binet (1916) early acknowledged this in saying, "The result [of an intelligence test] depends . . . on acquisitions relative to language and vocabulary, which are at once scholastic and extra-scholastic, depending partly on the school and partly on the family circumstances." (p. 258) In the work of Eels et al.(1951), an analysis of items taken from a battery of cognitive tests showed that the verbal items produced greater differences between the social groups than did non-verbal items. They state, "Every category of verbal items which involves any understanding of the meaning of words yields status differences larger than the average status

difference for all items . . ." (p. 221) Bernstein (1958, 1960) gave intelligence tests which had verbal and non-verbal scales to 370 lower social class children. The score on the verbal scale was depressed when compared to the non-verbal component.

The impact of language deprivation is not restricted solely to performance variables requiring use of written or spoken words, but seems to have a pervasive influence on a broad spectrum of cognitive skills. A person's native language is the primary tool for thinking about the environment in which he operates. The degree to which a person has facility with all the logical and descriptive alternatives in his language parallels the degree to which he has developed his more general cognitive skills of classifying and logically organizing the myriads of stimulation patterns in his environment. The dynamics of this relationship between language and cognition are still largely in the form of unanswered questions. Is an increased exposure to a variety of language experiences reflected in such general cognitive skills as concept formation and problem solving? Or, does a general intelligence factor manifest itself in concomitant variability among the more specific abilities of concept formation, problem solving, and language competence? The issue, in short, is the function of language in the general information processing activities of the human organism.

Bernstein (1959, 1962) has issued some strong statements in support of a linguistic determinism position which places language in a central role in the development of intelligence.

> It is proposed that forms of spoken language in the process of their learning, elicit, reinforce, and generalize distinct

> types of relationships with the environment and thus create particular dimensions of significance. Speech marks out what is relevant--affectively, cognitively, socially--and experience is transformed by that which is made relevant. (1959, p. 288)

Bernstein's position is similar to the Whorfian idea that the nature of different national languages determines to a great extent the national character or Weltanschauung of a country (Carroll, 1964). Bernstein goes one step further to say that within a given language, different social dialects exist which result in different "life-views."

> It is proposed that two distinct forms of language use arise because the organization of these two [social] strata is such that different emphases are placed on language potential. Once the emphasis or stress is placed, then the resulting forms of speech progressively orient the speakers to distinct types of relationships of objects and persons. (p. 291)

Deutsch (1963) stresses the central role of language in the development of intelligence in his writing and in the compensatory programs (1965) he has organized for preschoolers in New York City. He cites the work of Piaget and Vygotsky as supporting a model of cognitive processes in which language is "the essential ingredient in concept formation, problem solving, and in the relating to an interpretation of the environment." (1963, p. 176)

Jensen (forthcoming) discusses the significance of verbal behavior in terms of the symbolic, mediating value which words acquire in the course of psychological development. He uses several types of S-R paradigms to describe the function of verbal behavior in concept formation

and problem solving. A variety of verbal experiences is needed to build up an adequate semantic system, which consists of hierarchical and associational networks among words, and between words and other environmental stimuli. The extent of differentiation and complexity within this system comprises a substantial part of what is measured by intelligence and achievement tests. Jensen cites the work of Luria (1961) in which the regulatory aspect of verbal behavior is described. Children, after about four or five years of age, use internalized speech to represent aspects of their environment and control their own behavior. In the light of the extensive psychological consequences of verbal behavior, Jensen states "To the extent that a person is prevented, by whatever reason, from falling heir to these consequences of his human potential for verbal learning, he will fall short of his potential as a human being." (p. 32)

Language Features and Information Processing

The problem on which this research is focused concerns the impairment of communication between speakers having different language patterns. The aspect of communication which is crucial to classroom verbal interaction is the extent to which verbal messages are decoded by the listener. Of particular interest in this research is the effect of language differences on the specific cognitive ability of short-term verbal memory. Short-term memory, as measured by immediate memory span and immediate recall procedures, is a function of the Ss memory span length, the structure of the presented material, and the S's past experience with the elements and the structure of the message. The relevant

literature regarding (1) immediate memory span, (2) the effect of frequency of units on memory, (3) the effect of structural features on memory will be successively reviewed.

Memory span.--Three reviews of the literature on memory span are available (Blankenship, 1938; Munn, 1954; Van de Moortel, 1965). Digits, letters, consonants and vowels, nonsense syllables, and, sometimes words have been used to establish memory span.

A summary and interpolation of the several studies demonstrating developmental trends in memory span shows a digit span of approximately 3 at age 4, 5 at age 6, 6 at age 8, 7 at age 12, and 7.8 at age 16. Word span increases from 2 at age 6, to 3.1 at age 8, to 4.5 at age 13, to 4.7 at age 16 (Van de Moortel, 1965). The most pertinent aspect of the memory span literature is the nature of the growth rate which increases rapidly from 4 to 7, then begins to level off, and reaches an asymptote in the early teens.

Immediate memory span has long been used as a test of mental ability because of its regular growth with chronological age. Substantial correlations with mental age at a given level have also been reported consistently, but at least two studies cited by Van de Moortel did not find this relationship significant (Beebe, 1944; Metraux, 1944).

Effects of unit frequency.--Underwood and Schulz (1960) summarize the research findings which might answer the question, "Is there a direct relationship between rate of learning verbal units and the frequency with which a subject has experienced these units?" (p. 56) Hall (1954) found significant differences using word lists taken from four different frequency levels. The mean differences in recall

were relatively small, however, ranging from 12.04 with words of frequency 1 per million to 15.04 with words of frequency 50-100 per million. Jacobs (1955) reported a .74 correlation between Thorndike-Lorge frequency values and number of correct responses in a paired-associate task in which the frequencies of response words were varied. Bousfield and Cohen (1955) showed a statistically significant difference in recall between lists of high and low frequency words. The mean differences again were relatively small, 25.55 words recalled of the high frequency items, and 22.18 words for the low. Peters (1936) did not find a relationship between frequency and learning. Underwood and Schulz suggest that the relationship between frequency and ease of learning could be considerably greater than indicated by the available research. The full range of word frequencies has not been explored, and thus, only a part of the curve indicating this relationship is known. The slope of this curve for words of relatively low frequency is not known.

Garner (1962) also reviews studies regarding the psychological effects of the distributional frequencies of letters and words. (pp. 247-252) He concludes his review by stating, "We have seen that the probability of a human subject's using a word or letter [in a variety of experimental settings] is a direct function of the probability of the word's or letter's occurrence in normal English usage." (p. 252)

Effect of inter-unit structure on verbal learning.--Memory for verbal stimuli is limited by the span of immediate memory, but is capable of expansion by utilizing the regular structural patterns which characterize natural and artificial languages. In natural languages, phonemes, morphemes, words, and word phrases are strung together according

to a set of rules. As these rules are learned through experience with a language, larger and larger chunks of language can be remembered. The amount of information in a verbal message is directly related to the perceiver's familiarity with these structural rules. And, the amount of information in a message is directly related to the ease of learning the list.

The relevant research investigates the effects of natural language structure on a listener's ability to store and process verbal messages from that language. The structure of a verbal message is determined by sequential constraints at the phonological, grammatical and semantic levels.

The effects of some within-word constraints were investigated by Underwood and Schulz (1960). Using three-word trigrams, they found a .80 correlation between ease of learning and a measure of the strength of learned associations among the letters.

Garner (1962) summarizes the research related to sequential redundancies in English. This research involves visual and auditory presentation of language stimuli for the purpose of determining the psychological effects of between-unit constraints. Miller, Bruner, and Postman (1954) showed that accuracy of perception of eight-letter sequences is a function of the order of their approximation to English. Statistics regarding the distributional frequencies of letters and letter sequences were used to generate five approximations (0, 1, 2, 3 and 4) to English letter order. The longer the intra-letter constraints the more accurately the eight-letter sequences could be recognized from tachistoscopic exposures of different durations.

Chapanis (1954) investigated the ability to correctly replace deleted letters from printed English. Using various rates of deletion,

he found that accuracy of replacement varied inversely with the rate of deletion. He also found important individual differences in the ability to perform this task, and that performance on this task was positively related to a subject's verbal skill. "Thus, the extent to which redundancy is used by human subjects does depend on their level of skill in using the language." (p. 257 in Garner)

A study by Morrison and Black (1957) investigated the effects of inter-word constraints by having Ss replace words deleted from sentences. The greater the rate of deletions the less the number of words which could be accurately replaced, indicating the extent to which contextual cues are utilized in processing information.

Several studies have used approximations-to-English-word-order (AEWOs) to study the relationship between amount of contextual constraint and learning. An n-order approximation to English list contains words with contextual constraints extending over n-words, that is, every n-word cluster in the list could be a part of a correct English sentence. A fourth-order list for example, is produced by asking a person to use three words successively in a sentence. The word this person uses immediately after the three words provides a four-word group, and the remaining words are disregarded. The last three words of this four-word group are then used by another person in a sentence, and a list of the desired length is constructed.

Miller and Selfridge (1950) were the first to use this technique. They generated word strings of varying lengths at seven AEWOs; 0, 1, 2, 3, 4, 5, and 7. They used these AEWOs and portions from text as stimulus materials for an immediate recall task. Recall increased sharply

at each succeeding approximation from C to 3 and increased very little from 3 through the text lists. The mean percentage recalled of the lists which were twenty words in length for the eight levels was 30, 44, 65, 85, 83, 80, 86, and 82 respectively. Specific lists produced irregularities in the learning curve, but in general, no large increases in learning resulted from increasing the contextual constraints beyond three words. Miller concluded, "The results indicate that meaningful material is easy to learn, not because it is meangful, per se, but because it preserves the short range associations that are familiar to the Ss." (p. 204)

Garner (1962) reports that both van de Geer (1957) and Sharp (1958), using the same technique and scoring procedures confirmed the original finding that amount of immediate recall is a function of the AEWO of the stimulus lists. Richardson and Voss (1960) replicated the findings of the Miller and Selfridge study, and, in addition, found that the variables of ordinal position and sequence which were confounded with AEWO in the original study, did not yield significant differences in words recalled.

Several studies, using different scoring procedures, did show increased learning beyond the third AEWO lists. Marks and Jack (1952) found that immediate memory span increased beyond third-order AEWOs, with a sharp increase between fifth-order and text lists. Coleman (1963) found that prose could be recalled significantly better than the higher-order approximations if the stimulus lists were matched in syllabic length and word frequency. When the recall was scored for correct sequences of words, the advantage for the higher-order approximations became greater. Apparently, the shape of the obtained

learning curve depends on the scoring method used.

Rubenstein and Aborn (1958) showed that rate of learning word passages depended on the predictability of the words in the passage. An average prediction score was calculated for each passage by asking subjects to guess in sequence all the words in a passage. This predictability score correlated .73 with the amount of the passage which could be recalled in a free recall task.

Epstein (1961) used real words and nonsense words as well as grammatical and ungrammatical sentences to show the influence of structure on learning. Although both structure and the use of meaningful words produced significant effects, the strength of the structural variable is surprising. For example, the grammatical but nonsense-word "Avapy koobs desaked the citar molently um glox nerfs" could be correctly recalled with as few trials as the ungrammatical but real-word "Sang tables bitter empty cruel to circle pencils falling," and with significantly fewer trials than "Avap koob desak the citar molent um glox nerf," a string with fewer morphemes but lacking some grammatically important word endings. A later study (1962) by Epstein with different words again showed the positive effects of syntactic structure on verbal learning.

Miller and Isard (1963) presented to adult subjects three kinds of sentences through noise--semantically consistent, grammatical but not semantical (anomalous), and scrambled sentences. The subjects were required to repeat each word of the sentence immediately following presentation. At several different noise levels, subjects were

able to fill in more of the semantical strings than the anomalous strings, and more of the anomalous strings than the scrambled strings.

Miller and McNeill (forthcoming) repeated the same experiment with 5, 6, 7, and 8 year-old children except that vocabulary items were altered and the task was changed from shadowing to immediate recall. They found at a 5 db S/N level that the results were similar to that of the previous experiment. But age showed a strong interaction with recall on the semantically consistent sentences. The older the child the more he was able to utilize the reduction of information provided by the semantic constraints of the sentence. Eight-year-old children recalled 50 percent of the semantically consistent sentences as compared to 20 percent for the seven-year-old and 12 percent for the five-year-old groups. The recall curves for the anomalous and ungrammatical strings over the different age levels are almost parallel and show small increase with age.

Rosenberg (1966) created sentences which varied on syntactic structure as well as degree of associativity among the words. Both effects produced significant differences in recall, but there was no interaction between the effects of syntactic structure and associativity.

Martin and Roberts (1966) defined sentence structure with the variable of "imbeddedness," which is closely related to the concepts of contextual constraint and sequential probabilities. A number is assigned to each word in a sentence depending on the number of alternatives which can follow that word. An average of these numbers for each of the words

in a sentence provides an index of sentence complexity. They found that this measure was a "definitive factor in sentence retention." (p. 216) A second factor in this research was sentence kind, with six different grammatical forms represented. The authors reported that "when sentence complexity and sentence length are controlled, the role of sentence kind in explaining recall behavior becomes marginal." (p. 216)

Many more studies deal with the effects of structure, per se. Of primary relevance to the present research were studies which dealt with the effects of natural language constraints on verbal recall. Sequential probability, contextual constraint, approximation-to-English-word-order are different concepts used to define the regularity with which phoneme follows phoneme, and word follows word in a given language. The studies cited in this section showed that the closer the elements of a message match the patterns of a person's native language, the easier it is to retain that message. These findings, combined with the studies describing different structural patterns among the dialects of different social groups, lead to the major thesis of this study: the structural differences between social dialects result in communication difficulties between speakers from different dialect groups.

Very little research has been done to date which deals directly with this problem. Cherry-Peisach (1965) set out "to evaluate (a) the extent to which information is successfully communicated from teachers to pupils of various social backgrounds, and (b) the degree of effective communication among children from different social backgrounds." (p. 468) Subjects were Negro and Caucasian first- and

fifth-graders selected from high and low social groups. Paragraphs to be used in a Cloze task were collected from teachers and children. One paragraph was selected from the recorded classroom speech of both a first-grade and a fifth-grade teacher. Four paragraphs of children's speech were obtained from subjects with different social class, race, and sex combinations. Since six unique combinations of these three factors are available, these source variables were partially confounded. The last word in every sentence was deleted for presentation to the first-graders; every fifth word was deleted for presentation to fifth-graders.

These six paragraphs with 10 deletions each were presented to the first-graders auditorially and to the fifth grade both auditorially and visually. Three scores were derived for each S on each paragraph: an absolute score for the number of exact insertions, a contextual score if the word maintained the same meaning as the original, and a grammatical score which counted all insertions which were of the same form class as the word deleted.

The findings relevant to the present research concern the interaction between race and paragraph source and between social class and paragraph source. At the first grade level this important analysis is not included in the report. The author only reports that in the first grade, SES differences were present only on the contextual scores for teacher's speech, and that there were no Negro-White differences at the first-grade level.

At the fifth-grade level, there were no SES differences in replacing words from the LSC paragraphs but a significant difference in

favor of the MSC group on the MSC paragraphs. This result produces a significant SES by paragraph-source interaction. A similar interaction is found between race and paragraph source. There were no Negro-White grammatical score differences on the two paragraphs taken from Negro speech, but the white children did significantly better on the two paragraphs provided by white children.

This research is not very conclusive because some of the relevant scores are not presented, and because social class and race scores are always confounded. But the interaction effects do indicate that Negro and LSC Ss were penalized by tasks which required knowledge of white and middle social class language patterns, respectively.

Summary

Research was cited which showed that distinctive linguistic features are associated with social class and ethnic group membership. A person's knowledge of the standard English linguistic system is also a function of social class membership. Children from the lower social class perform lower than their middle social class counterparts on measures of language use. Literature was cited which supported the argument that the achievement and intelligence deficits of the lower social class children are at least partially caused by their language disabilities. In order to explain the dynamics of this relationship between language and school achievement, research was cited which showed that a person's ability to process verbal and written messages was dependent on the frequency with which he had encountered the letters, words, and word-orders which comprised the messages.

CHAPTER III

HYPOTHESES

The research cited in the previous chapter supports several hypotheses regarding the effects of structure and familiarity on the recall of verbal messages. The "common-sense" notion, which underlies these hypotheses, is that a person can remember more of a verbal message if it contains familiar words and familiar intra-word structure than if it contains unfamiliar words and structures. In other words, a person's performance in recalling verbal messages will reflect the characteristics of his past language environment. The research reported in the previous chapter also indicates that word frequencies and intra-word constraints vary according to the social and ethnic background of the speaker.

Three propositions lead to the hypotheses of this study. (1) Within any large metropolitan area or geographical region, language differences exist. These differences can be defined in terms of the frequency and structure of the elements which comprise a language. (2) The frequency and structural characteristics of a person's native language influence his performance on language tasks. Those tasks which most closely match the features of his learned language are the tasks on which he performs best. (3) The school is a setting in which people from different dialect backgrounds are engaged in interpersonal communication endeavors.

The first hypothesis concerns the effects of the interaction between the phonetic features of a message and a listener's phonetic system.

Hypothesis One.--Children remember a verbal message better if it is presented by a speaker from their own community than if it is presented by a speaker from a community having different social and ethnic characteristics.

A test of this hypothesis requires the selection of two communities having different social and ethnic characteristics which are known to be related to differences in language features. The hypothesis states that a person from community A will be able to remember more of a verbal message if it is spoken by a member of community A than if that same message were spoken by a member of community B, and vice-versa for a person from community B.

Hypothesis Two.--Children remember a list of unstructured words better if those words are selected from the speech of members of their own community than if the words are selected from the speech of members from a community having different social and ethnic characteristics.

This hypothesis concerns the effects of vocabulary differences between two different language communities. Since the frequency with which a person sees or hears a word is related to his ability to remember that word, it is predicted that the differences in word frequency patterns between language communities will be reflected in the performance of members from these communities on memory tasks using words selected from different sources.

Hypothesis Three.--Children remember verbal messages better which contain grammatical features if the structured messages are selected from the speech of members of their own community than if the words are selected from the speech of members from a community having different social and ethnic characteristics.

This hypothesis concerns the effects of different inter-word structure on the recall of verbal messages. It states that differences in inter-word constraints between the language patterns of the two communities will be reflected in the performance of members from both communities on memory tasks using messages which contain syntactic, inter-word structure. Of course, vocabulary differences, such as those involved with the second hypothesis, would also be operating in any such message. It will be shown, in the procedure (Chapter IV), how the research design will permit a test of each hypothesis separately and isolate the effects of a particular feature of language.

CHAPTER IV

PROCEDURE

Introduction

The procedure was designed to provide a test for the three hypotheses and to control or randomize extraneous variables which could affect the dependent measure of list recall. A test of the first hypothesis required that children from two distinct social and ethnic groups be presented with messages by representatives of both adult groups. An additional requirement for a test of the second hypothesis was that lists of words be obtained which had no inter-word structure but were representative of the type and frequency of words in the vocabulary of each of the two groups. An additional requirement for a test of the third hypothesis was that lists of words be obtained which had varying levels of inter-word structure, and that this structure reflected the syntactic differences in the language of the two groups.

In order to implement these requirements, five procedural steps were carried out. First, word lists of three different approximations-to-English-word-order were obtained from each of two groups of adult women from communities with disparate ethnic and socio-economic characteristics. Second, eight adults made judgments regarding the source of the lists, and those lists which were most readily identified with their source community were selected for use in the subsequent steps. Third, the

selected lists were read and recorded by two women from each of two dialect groups. Fourth, the lists were presented to first-graders from each of the two communities as an immediate recall task. Fifth, the recorded responses were scored.

Language Samples

Two elementary school districts in suburban Detroit with different ethnic and socio-economic features were selcted for the purpose of obtaining language samples which represented different social dialects. The principal factors used in selecting the two communities were the race, educational level, occupation, and places of birth of the residents. The generic labels of lower social class (LSC) and middle social class (MSC) will be used to identify the constituents of these two school districts.

The LSC school district is in an area adjacent to metropolitan Detroit. Approximately 85 percent of this community is Negro, most of whom were born in the South. The mean educational level of the adults is 9-10 years with a very small proportion of high school graduates in the community. Almost all of the adults in the community are employed as unskilled laborers.

The MSC school district is in a new suburban area outside of Detroit. The adults of the community are Caucasian, and most are native to the Midwest. Most of the adults of the community attended college and a large proportion have college degrees. They are employed in professional, managerial, and skilled trade occupations.

From each of these communities fifteen women were selected to provide the initial language samples. In the MSC school district,

women from the PTA organization were asked to participate by the principal of the school. In the LSC school district, women who brought their children to a preschool story hour at the school were asked to participate by the coordinator of special projects at the school. Because of the selection procedures, the two groups of women may represent a sample that is biased positively compared to the total community. The mean educational level of the LSC group of women was 10-11 years, and from the MSC community was 14-15 years. All of the LSC group were Negro women, born in the South. All of the MSC group were Caucasian--three of the fifteen were born in the East and the remaining twelve were born ir the Midwest.

Verbal strings were collected according to a procedure described by Miller and Selfridge (1950), from both the LSC and MSC groups of women. This procedure yields word lists with different approximations-to-English -word-order (AEWOs).

Samples of 1-, 2-, and 4-order AEWOs were obtained from each group of adults. A second order approximation is obtained in the following manner:

> . . . a common word, such as he, it or the is presented to a person who is instructed to use the word in a sentence. The word he uses directly after the one given him is then noted and later presented to another person. This procedure is repeated until the total sequence of words is of the desired length.
>
> (Miller and Selfridge, in Saporta, 1961, p. 201)

In general, an nth order approximation is obtained by presenting a person with (n-1) consecutive words obtained from the previous person and asking him to use those words in a sentence.

The sentences were collected from the LSC group in a session conducted by a male, adult Negro who was acquainted with the women through his role as coordinator of special projects in the community. The session with the MSC group was administered by a Caucasian adult woman. In both sessions, women were called individually from a group meeting to a private office where they were asked to provide sentences using the word or words suggested by the examiner. Each of the fifteen subjects (Ss) were asked to use each of four words and four three-word groups in a sentence. All responses were recorded. This procedure yielded four fifteen-word sequences of both second and fourth order AEWOs from each group of subjects.

The 120 sentences provided by each group formed a pool of 965 and 805 words for the MSC and LSC groups respectively. Four fifteen-word AEWO-1 lists were constructed by selecting words randomly from each of these word pools. The first order lists are an approximation to the relative frequencies of words provided by the two groups. A total of twenty-four word lists were constructed--four lists at each of three AEWOs from two dialect groups--and are presented in Table 4.1.

Source Judgments

Hypotheses Two and Three are based on the assumption that the fifteen-word lists contain distinctive semantic and syntactic features which identify the list with its source. In order to select the lists which were most distinctively associated with their source, adults who were

TABLE 4.1

WORD LISTS AT THREE APPROXIMATIONS-TO-ENGLISH-WORD-ORDER
OBTAINED FROM TWO SOURCES

First-Order Lists

LSC Source

List 1 Have more their going people not journey dinner good very was arm the day sleep
List 2 Belong see tomorrow a exercise are my deal make is I prettier very as my
List 3 He baby am I way the basement them morning to come our was me I
List 4 Are going go alumnae live cooking would down I much others very is house parents

MSC Source

List 1 A of often quite school machine hit this do livingroom was room end can I
List 2 Say child down their near are I corner we pool a our of coming my
List 3 Tell he again grass the he mistakes that quite here you test ball face a
List 4 Of little mouse to will cat airplanes end when is very pretty I he green

Second-Order Lists

LSC Source

List 1 In the home tomorrow it is this is you are you are not go to
List 2 Bus down the class of that was good today I would you are playing Peco
List 3 And I am going my arm are you are you would you can't go to
List 4 Trees in the streets were late this book is this is this is the boy

MSC Source

List 1 Was the dog at the house is going to the grass in your name is
List 2 Mistakes in the cat is this is feeling that you and quite sure this is
List 3 The bird flew south in the chair is black gown was surprised by a store
List 4 The girls joined others in the school is pretty face was afraid of velvet and

Fourth-Order Lists

LSC Source

List 1 Is turned people funny except when I am angry because the bus broke down on
List 2 My house I help is very easy but she's is a teacher cooperative with the
List 3 Is in every thing he does doesn't never come because she broke her leg when
List 4 Now is used her yet but she's doesn't never have anytime for this baby I

MSC Source

List 1 Coming from corner we drove around the block and threw it at the movies throwing
List 2 The bushes until fall are cancelled immediately because he was with her when the telephone
List 3 Last evening that lamp in the livingroom stands near the door when I came that
List 4 At the grocery store there's a line extending from the garage the attic and the galosh

familiar with speakers from both types of language communities were asked to assign each of the lists to the group from which it was collected. The adults selected as judges were four teachers from the same school district as the LSC adult population and four other adults who regularly interacted with members from both language groups.

The procedure which was used to collect the word samples was explained to the judges. The following description of the adult populations was presented to each judge:

Group 1 Description

The adults who supplied the words for the Group 1 lists were Negro women aged 25-40. They live in one of the older suburban areas just outside of Detroit. The area is made up of one- and two-family homes with a scattering of multiple-family apartments. Almost all of the male residents of this area are employed at local factories in "blue-collar" jobs. The adults in the community have completed on the average about 9-10 years of school. In the community, there are many retail business establishments along one of the main traffic arteries coming out of Detroit.

Group 2 Description

The adults who supplied the words for the Group 2 lists were Caucasian women aged 25-40. They live in one of the new suburbs outside of Detroit. The residential area is made up of new one-family dwellings. Almost all of the male residents are in a profession or employed as managers or skilled laborers. Most of the adults in the community have attended college

and have an average education of about 14 years. The community is a self-enclosed suburb with new shopping centers in the vicinity.

Each judge was presented the eight lists at each AEWO and asked to assign four lists to each of the source groups. The judges were also asked to underline the word or words in the list which they used in making their judgments. The results of the judge's assignments are presented in Table 4.2.

TABLE 4.2

SOURCE JUDGMENTS OF WORD LISTS AT THREE APPROXIMATIONS-TO-ENGLISH-WORD-ORDER BY EIGHT JUDGES

	First-Order List Judgments		Second-Order List Judgments		Fourth-Order List Judgments	
	LSC	MSC	LSC	MSC	LSC	MSC
LSC Source						
List 1*	1	7	7	1	5	3
List 2	0	8	4	4	7	1
List 3	6	2	8	0	8	0
List 4	2	6	7	1	8	0
MSC Source						
List 1	7	1	3	5	2	6
List 2	5	3	2	6	1	7
List 3	7	1	0	8	0	8
List 4	6	2	0	8	1	7

* Lists are provided in Table 4.1

The two AEWO lists from each group which could be most readily identified with their source were selected for use as stimulus lists in the subsequent memory task. The six lists selected from each source group are presented in Table 4.3.

TABLE 4.3

WORD LISTS OF THREE APPROXIMATIONS-TO-ENGLISH-WORD-ORDER FROM TWO DIFFERENT SOURCE GROUPS

Lists Collected from LSC Adults	
	AEWO-1
LSC-1A	Me baby am I way the basement them morning to come our was me I
LSC-1B	Are going go alumnae live cooking would down I much others very is house parents
	AEWO-2
LSC-2A	And I am going my arm are you are you would you can't go to.
LSC-2B	In the home tomorrow it is this is you are you are not go to
	AEWO-4
LSC-4A	Is in every thing he does doesn't never come because she broke her leg when
LSC-4B	Now is used her yet but she's doesn't never have anytime for this baby I
Lists Collected from MSC Adults	
	AEWO-1
MSC-1A	Say child down their near are I corner we pool a our of coming my
MSC-1B	Of little mouse to will cat airplanes end when is very pretty I he green
	AEWO-2
MSC-2A	The bird flew south in the chair is black gown was surprised by a store
MSC-2B	The girls joined others in the school is pretty face was afraid of velvet and
	AEWO-4
MSC-4A	Last evening that lamp in the living room stands near the door when I came that
MSC-4B	The bushes until fall are cancelled immediately because he was with her when the telephone

Preparation of Stimulus Materials

Two women, representative of each dialect group, were selected to read the stimulus lists. The two MSC speakers selected were Caucasian, had attended college, and had lived in the Midwest all their lives. Both LSC speakers were Negroes who were born in Tennessee. LSC speaker-1 had a sixth grade education and moved to Michigan two years ago; LSC speaker-2 had an eighth grade education and moved to Michigan fifteen years ago.

After sufficient practice to insure a standardized presentation, each speaker recorded each of the twelve lists from Table 4.3. The lists were read as word lists without any sentence inflection at the rate of one word per second. LSC speaker-1 and MSC speaker-1 also read nine strings of digits ranging in length from 3 to 9 digits (see Table 4.4). These were read at the rate of one per second with a dropping inflection on the last digit in the list.

TABLE 4.4

DIGIT SPAN TEST

Item	Digits	Item	Digits
1	8-1-7	6	9-3-8-4-6-5
2	5-9-1-2	7	2-4-8-1-7-3
3	6-3-4-8	8	1-7-3-6-2-4-9
4	7-1-6-2-4	9	4-8-2-5-7-1-6
5	3-5-9-2-8		

The recording sessions with both the LSC and MSC speakers were conducted by a male Caucasian. An Ampex, Model 601-2, tape recorder was used with an Electro-Voice microphone, Model 644. Broad phonetic transcriptions of the lists read by each speaker are presented in Appendix I.

At least six different phonetic features consistently distinguish between the MSC and LSC speakers. (1) The LSC speakers drop the post-vocalic /r/, i.e., [doə] for [dor] and [ɔm] for [arm]. (2) The LSC speakers use a final /n/ rather than /ŋ/ on progressive verb forms, i.e., [kʌmin] for [kʌmiŋ] and [kukin] for [kukiŋ] (3) The LSC speakers drop the final consonant of double consonant combinations, i.e., [čaɪ] for [čayld] and [pɛrə^{n}s] for [pɛrənts]. (4) The LSC speakers omit vowel glides on final vowels, i.e., [a·] for [ay] and [bæ] for [bay]. (5) The LSC speakers add a vowel glide before consonants, i.e., [ɪ^{ə}z] for [ɪz] and [lɪ^{ə}v] for [lɪv]. (6) Some of the MSC mid-vowels are pronounced as back vowels by the LSC speakers, i.e., [wɔz] for [wəz] and [bɪkɔwz] for [bikʌz]. The speaker differences referred to in Hypothesis One are operationally defined by these and other less consistent phonetic differences between the LSC and MSC speakers.

Immediate Recall Test

The subjects for the immediate recall task were selected from the same school districts as the two groups of women who supplied the lists. Twenty-four first-grade subjects (Ss) from both the LSC and MSC groups were selected randomly with several restrictions. An equal number of boys and girls were selected in the 75-87 month age range. In the LSC group only Negro children whose parents were born in the South were

selected, and in the MSC group only Caucasian children whose parents were born in the Midwest were selected. Restrictions on sex and age were intended to eliminate these as possible sources of bias. The restrictions of race and parent's birthplace helped to control these two variables which characterized the dialect groups under study.

The mean age of the LSC Ss was 82.0 months; the mean age of the MSC Ss was 82.7 months. A measure of IQ was available on the MSC Ss only. Their mean IQ on the Primary Mental Abilities Test was 114.5--on the verbal scale alone the mean score was 105.9. The mean educational level for the parents of the Ss was calculated from the self-reported data in the student's personnel file. This information was available for the parents of 20 Ss from the LSC group and 21 Ss from the MSC group. The mean educational level for the parents of the LSC and MSC Ss was 10.2 and 14.2 respectively.

Table 4.6 illustrates the ordering of lists on the stimulus tapes using the list labels provided in Table 4.3. Each subject was tested at two different times with all twelve lists. During the first administration, six of the lists were read by a LSC speaker and six by a MSC speaker. During the second administration, the same twelve lists were presented, but the six lists presented by the MSC speaker during administration one were then presented by the LSC speaker, and the six lists presented by the LSC speaker during administration one were then presented by the MSC speaker. Each subject heard sentences from only one pair of speakers. MSC speaker-1 and LSC speaker-1 presented all lists to Ss in block one; MSC speaker-2 and LSC speaker-2 presented all lists to block two Ss.

TABLE 4.6

ORDER OF LISTS ON STIMULUS TAPES

Block one Ss		Block two Ss	
First Administration	Second Administration	First Administration	Second Administration
MSC-4B*	MSC-4B	LSC-1B	LSC-1B
LSC-1B	LSC-1B	MSC-4B	MSC-4B
MSC-2A	MSC-2A	LSC-2A	LSC-2A
LSC-4A	LSC-4A	MSC-1B	MSC-1B
MSC-1B	MSC-1B	LSC-4A	LSC-4A
LSC-2A	LSC-2A	MSC-2A	MSC-2A
LSC-4B	LSC-4B	MSC-1A	MSC-1A
MSC-1A	MSC-1A	LSC-4B	LSC-4B
LSC-2B	LSC-2B	MSC-2B	MSC-2B
MSC-4A	MSC-4A	LSC-1A	LSC-1A
LSC-1A	LSC-1A	MSC-4A	MSC-4A
MSC-2B	MSC-2B	LSC-2B	LSC-2B

* Underlined lists were presented by LSC speaker; lists not underlined were presented by MSC speaker. For complete list, see Table 4.3.

The order of list presentation was designed to balance out three kinds of sequential effects within a set of lists. The ordering within a set of twelve lists alternates the three AEWO levels, the two kinds of speakers, and the two sources of lists. Two different orderings of the three AEWO levels are possible. The ordering 4, 1, 2 is used for block one Ss; the ordering 1, 4, 2 is used for block two Ss.

A total of eight stimulus tapes were prepared. The four sets of twelve lists described in Table 4.6 were each preceded by each of the two sets of digits which were collected. The first administration

lists were preceded by the digit lists presented by a speaker from the same group as the Ss being tested. The second administration lists were preceded by digits presented by a speaker from the opposite group as the Ss being tested. Each stimulus set of twelve lists was recorded twice in succession on each stimulus tape in order that different starting points within a stimulus set could be used.

All of the Ss were presented the immediate memory span test by two female Caucasians who had previous teaching experience in the elementary grades. Ss were taken one at a time from their classroom and brought to a small testing room. During the walk to the testing room and preceding the task instructions, the examiners asked Ss several questions intended to establish rapport. The instructions for the task follow:

> Some ladies are going to be speaking on this tape recorder. They are going to say some numbers and some words. I would like you to listen to them, and then say them back to me. First of all I'll play the numbers. You listen closely, and when I turn off the tape recorder, you say the numbers in the same order in which you heard them. Do you understand what I mean by saying them in the same order? [E waits for acceptable response.] Here's the first one. Listen carefully.
>
> [Digit span test]
>
> Now you are going to hear some words on the tape recorder. Try to remember as many as you can, and say them back to me when you hear a beep. The lists are long so you won't be able to remember all of the words. You do

not have to say them back in the same order. Just say as many of the words as you can remember. Let's try one for practice. I'll say this one. 'Coming from corner we drove around the block and threw it at the movies throwing.' [E waits for response indicating the S has understood instruction.] Now listen to the lists on the tape. Wait until the beep at the end before you start.

The Ss were then presented the appropriate stimulus list, according to the format summarized in Table 4.6. If S responded with a word that was ambiguous, the examiner asked the child to repeat the word or use it in a sentence.

The first group of twelve Ss from each school were assigned to block one, the remaining twelve Ss were assigned to block two. Each of the twelve Ss in a block was assigned a unique starting point in the stimulus list. Ss were assigned, in the order that they were tested, to lists one through twelve as respective starting points. Ss were tested a second time with intervals between first and second administration ranging from four to fifteen days. All stimulus materials were presented on a Sony Model TC-800. All responses were recorded on a Wollensak, Model 1580.

Scoring Procedure

The taped responses were scored as an immediate recall task. The score for each list was the number of items correctly recalled regardless of order. All morphemes and syllables had to be present in order for a word to be scored correctly. However, different

pronunciations were allowed because Ss had different phonetic systems. If a word was judged to be a S's phonetic equivalent of a word on the tape it was scored correct.

Summary

Procedures were implemented to provide data that were required for a test of the three hypotheses. To obtain data for a test of the first hypothesis, children from the MSC and LSC groups were presented with lists which were read by both MSC and LSC speakers. Data relevant to the second hypothesis was obtained by presenting MSC and LSC Ss with words selected randomly from the speech of both the MSC and LSC adult groups. To obtain data for a test of the third hypothesis MSC and LSC Ss were presented lists with three different levels of inter-word structure which were collected from both MSC and LSC sources.

Extraneous factors which could affect the dependent variable were balanced across groups for increased control. Both groups contained an equal number of boys and girls within a twelve month age range. The sequence of speaker, source, and AEWO within a stimulus presentation was systematic. The effects of different list orders were controlled by assigning different starting points within the sets of stimulus lists. Other more obvious sources of variation for the two experimental groups were likewise controlled, such as rate and volume of list presentation.

CHAPTER V

ANALYSIS

This chapter deals with the statistical tests of the three hypotheses, utilizing the data obtained by the procedure described in the preceding chapter. A discussion of the implications of the analyses are presented in Chapter VI.

Sources of Variance

The hypotheses were tested by looking at the simple and interactive effects of four sources of variance. These sources of variance are as follows:

1. S's dialect background: MSC and LSC.
2. Speaker of message: MSC and LSC.
3. Source of message: MSC and LSC.
4. Approximation to English word order: one, two, and four.

The dependent variable is the number of words correctly recalled in the experimental setting described in the preceding chapter. The hypotheses concern three of the interactions among these factors.

A score for each subject was obtained on twenty-four different stimulus presentations. Table 5.1 presents the means and standard deviations for the number of words recalled by each of the two experimental groups.

The means and variances for each cell in the 2 x 2 x 2 x 3 data matrix are presented in Table 5.2. Each data point is the sum of scores

on two stimulus lists. For example, the mean score in the cell labeled MSC-subjects, MSC-source, LSC-speaker, AEWO-2, is the mean number of words recalled by the MSC subjects for lists MSC-2A and MSC-2B combined, when these were presented by an LSC speaker.

TABLE 5.1

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF WORDS RECALLED FROM TWELVE STIMULUS LISTS PRESENTED BY TWO SPEAKERS

	MSC Speaker				LSC Speaker			
	MSC Group (n = 24)		LSC Group (n = 24)		MSC Group (n = 24)		LSC Group (n = 24)	
List	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s
1. LSC-1A	4.29	1.66	3.58	1.72	3.63	1.91	2.96	1.66
2. LSC-1B	3.29	1.23	2.33	1.00	2.54	1.45	2.83	1.58
3. LSC-2A	5.29	2.01	4.58	2.08	5.08	1.67	5.21	1.72
4. LSC-2B	6.00	2.09	5.13	1.45	5.13	1.73	4.54	2.04
5. LSC-4A	5.75	1.37	4.92	1.89	4.79	1.32	5.75	2.11
6. LSC-4B	4.38	1.41	4.54	2.17	2.58	1.53	3.75	1.78
7. MSC-1A	4.25	1.51	2.25	1.19	2.21	.88	2.29	1.49
8. MSC-1B	3.92	1.35	2.83	1.47	2.50	1.38	2.04	1.12
9. MSC-2A	6.83	2.36	5.63	2.57	3.88	1.92	4.29	2.66
10. MSC-2B	5.29	2.33	4.63	1.95	3.63	1.58	3.79	2.02
11. MSC-4A	5.42	1.93	5.13	2.59	5.71	2.31	5.50	2.66
12. MSC-4B	6.00	2.38	4.92	1.98	4.00	1.82	4.50	1.91

TABLE 5.2

MEANS AND STANDARD DEVIATIONS FOR 2 X 2 X 2 X 3 DATA MATRIX

		MSC-Source						LSC Source					
		MSC-Speaker			LSC-Speaker			MSC-Speaker			LSC-Speaker		
		AEWO-1	AEWO-2	AEWO-4	AEWO-1	AEWO-2	AEWO-4	AEWO-1	AEWO-2	AEWO-4	AEWO-1	AEWO-2	AEWO-4
MSC Subjects (n=24)	$\bar{x}$	8.17	12.13	11.42	4.71	7.50	9.71	7.58	11.29	10.13	6.17	10.21	7.38
	s	2.03	4.17	3.30	1.66	2.73	3.33	2.20	2.91	1.51	2.75	2.75	2.18
LSC Subjects (n=24)	$\bar{x}$	5.08	10.25	10.04	4.33	8.08	10.00	5.92	9.71	9.46	5.79	9.75	9.50
	s	2.06	3.18	3.71	2.12	3.21	3.86	1.89	2.44	2.81	2.19	3.18	3.15

Information regarding all hypotheses can be obtained from one four-way analysis of variance with each of the above sources of variance defining the factors. The summary chart for the four-way analysis of variance is presented in Table 5.3. This analysis is a 2 x 2 x 2 x 3, fixed factor design with repeated measures over the last three factors (see Winer, 1962, Chapter 7). The following discussion refers to terms in this analysis.

Speaker Effects

To test the relationship stated in Hypothesis One, Ss' recall performance on lists presented by a speaker of their home dialect is compared to their recall on lists presented by a speaker of another dialect. Hypothesis One would be supported if MSC Ss remembered significantly more words from the MSC-presented lists than from the LSC-presented lists and the LSC Ss remembered significantly more words from the LSC-presented lists than from the MSC-presented lists. If both of these comparisons yields statistically significant results, the AB (groups x speakers) interaction term in the analysis of variance would necessarily be significant, and under these circumstances, be redundant information. However, if one or both of the above comparisons does not yield significant results, then the AB interaction might or might not be significant, and would supply additional information relevant to Hypothesis One. The AB interaction term indicates the degree to which the effect of different speakers is similar for both groups of Ss. In other words, the AB interaction is a comparison of the difference between the performance of the two groups on the MSC-presented lists with the difference between the groups on the LSC-presented lists.

TABLE 5.3

SUMMARY OF ANALYSIS OF VARIANCE FOR FOUR FACTORS: GROUP, SPEAKER, SOURCE, AND AEWO

Source of Variation	Ss	df	MS	F
Between Ss				
A (Groups)	71.55	1	71.55	2.13
Ss w. gps.	1545.29	46	33.59	
Within Ss				
B (Speakers)	325.51	1	325.51	88.21**
AB	144.99	1	144.99	39.29**
B x Ss w. gps.	169.75	46	3.69	
C (Source)	2.13	1	2.13	.29
AC	10.29	1	10.29	1.41
C x Ss w. gps.	335.49	46	7.29	
D (AEWO)	1865.55	2	932.77	125.71**
AD	52.96	2	26.48	3.56*
D x Ss w. gps.	682.82	92	7.42	
BC	55.62	1	55.62	12.06**
ABC	2.65	1	2.65	.57
BC x Ss w. gps.	212.32	46	4.61	
BD	17.39	2	8.69	1.79
ABD	1.16	2	.58	.11
BD x Ss w. gps.	446.45	92	4.85	
CD	121.46	2	60.73	9.35**
ACD	16.80	2	8.40	1.29
CD x Ss w. gps.	597.08	92	6.49	
BCD	67.65	2	33.82	8.62**
ABCD	12.50	2	6.25	1.59
BCD x Ss w. gps.	361.51	92	3.92	

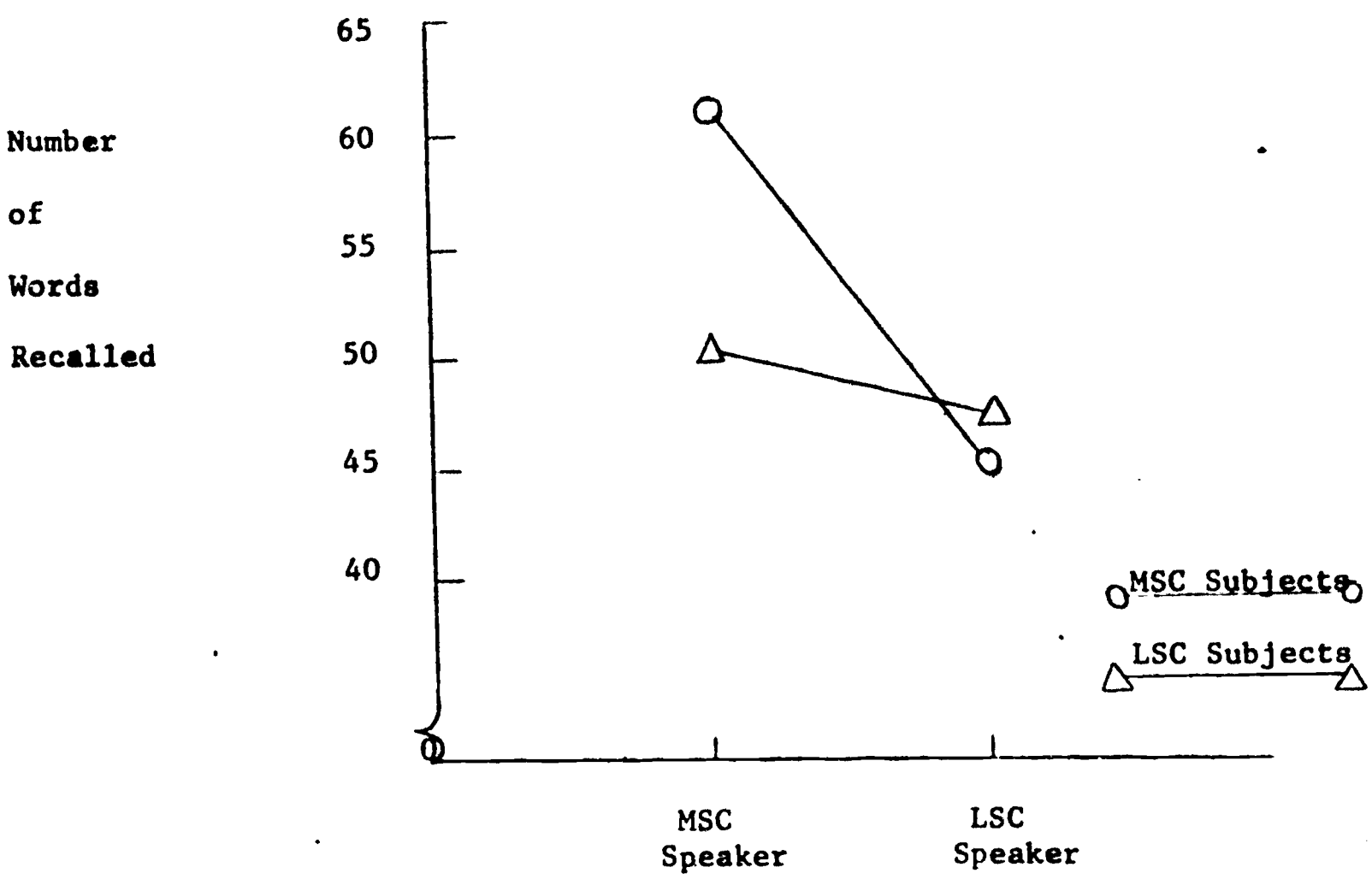
* p. < .05 $F_{.05}$ (1,46) = 4.06 $F_{.05}$ (2,92) = 3.11

** p. < .01 $F_{.01}$ (1,46) = 7.24 $F_{.01}$ (2,92) = 4.92

Figure 5.1 presents the data required for the comparisons regarding Hypothesis One. MSC Ss recalled a mean of 60.72 words and 45.68 words from the twelve lists presented by the MSC and LSC speakers respectively. This difference is significant ($t = 19.79$, $p < .001$). Every MSC S remembered as many or more words from the MSC-presented lists as from the LSC-presented lists.

FIGURE 5.1

NUMBER OF WORDS RECALLED BY LSC AND MSC GROUPS FROM LISTS PRESENTED BY LSC AND MSC SPEAKERS



LSC Ss recalled a mean of 50.46 words and 47.45 words from the twelve lists presented by the MSC and LSC speakers respectively. This difference is not significant ($t = -1.90$). Eight LSC Ss remembered more words from the LSC-presented lists than from the MSC-presented lists; sixteen Ss remembered more words from the MSC-presented lists.

The AB interaction is highly significant (F = 39.30), indicating that the effect of different speakers is not the same for both groups of Ss. This is graphically demonstrated in Figure 5.1 by the different slopes of the lines indicating recall of the two groups.

The significant AB interaction and the significant decrement in performance by the MSC group on LSC-presented lists support Hypothesis One. A significant decrement in performance for the LSC group on MSC-presented lists did not occur; this finding does not support Hypothesis One.

The main effects, A and B, although not having direct import for Hypothesis One, are of relevance to peripheral issues. The speaker main effect, B, is significant (F = 88.22). The combined groups of Ss remembered a mean of 55.58 words from the MSC-presented lists, and 46.57 words from the LSC-presented lists. The groups main effect, A, is not significant (F = 2.13, p > .10). The MSC Ss remembered a mean of 106.38 words, and the LSC Ss remembered a mean of 97.92 words from the twelve lists presented by each of two speakers.

Source Effects

Hypotheses Two and Three concern the effects of hearing messages which have semantic and syntactic properties which are different than those of the listener's dialect. It could be inferred from Hypothesis Two that the advantage of hearing a message in your own dialect would be present at AEWO-1 because of differences in word meaning and word frequency between the two dialects. Furthermore, it could be inferred from Hypothesis Three that this advantage would increase as syntactic structure was added to the stimulus tasks.

In the data analysis, the AC (groups by sources) interaction term indicates the degree to which the effect of different message sources is the same for both groups of Ss. The AC interaction term measures the effects of both the semantic and syntactic differences, whereas Hypotheses Two and Three concern the separate effects of semantic and syntactic differences respectively. Therefore, the significance of the AC interaction term is necessary, but not sufficient, support for either hypothesis. Support for Hypothesis Two would be provided by a significant AC interaction at AEWO-1, resulting from a significant increase in recall for Ss on lists collected from their home dialect when compared to their recall on lists collected from the other dialect. Stimulus lists at AEWO-1 were formed by random selection from the words provided by the two source groups and thus contain no syntactic component.

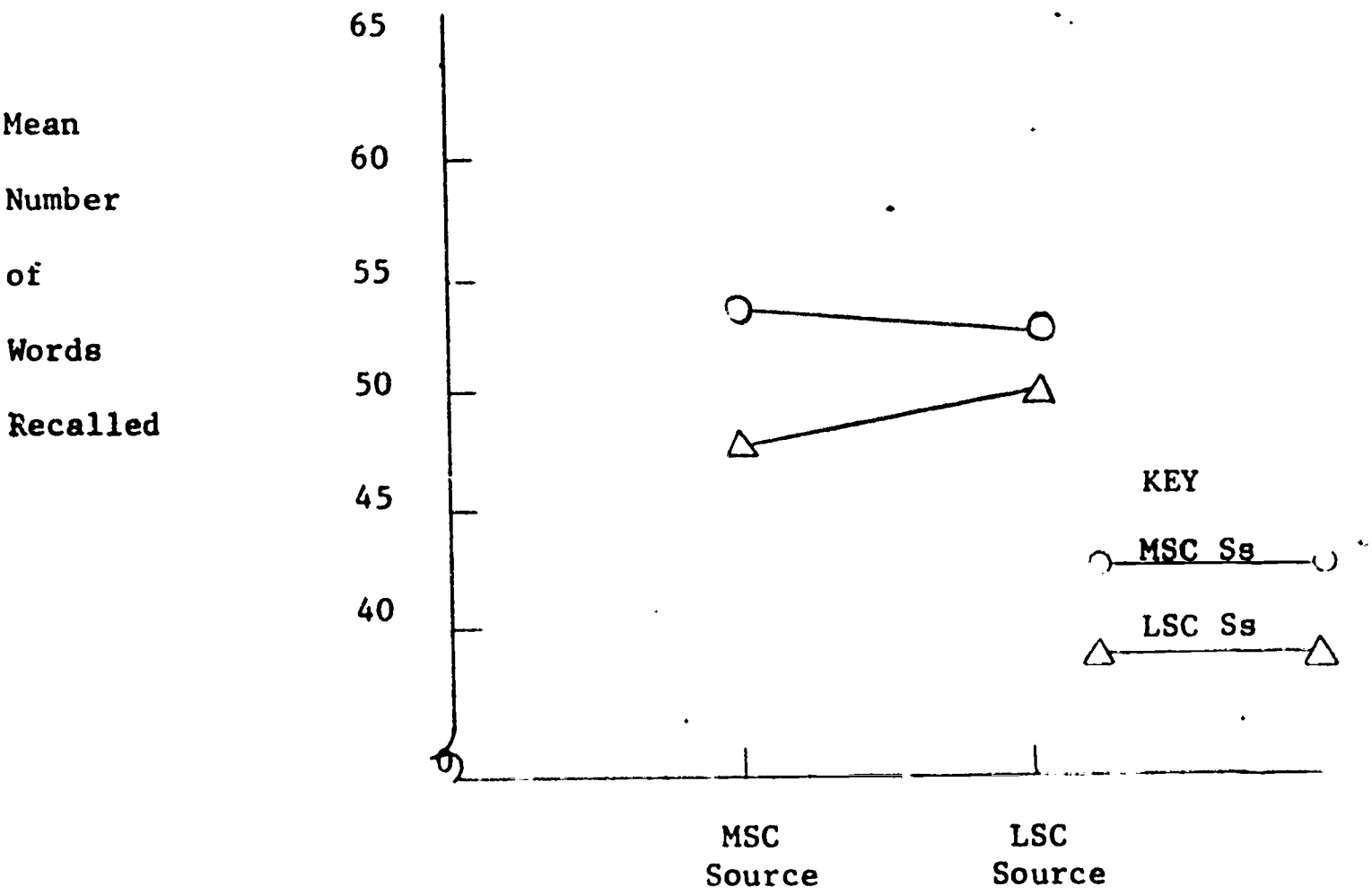
Hypothesis Three would be supported if the AC interaction would increase at levels AEWO-2 and AEWO-4. One would infer from Hypothesis Three that the added syntactic constraints at these levels would increase the advantage of hearing a message in the listener's own dialect. If Hypothesis Three were to obtain this support, a significant third-order interaction, ACD, would result from the desired AC interaction at AEWO-1 increasing at AEWO-2 and AEWO-4.

Neither hypothesis is confirmed by the data. Figure 5.2 illustrates that the combined effects of semantic and syntactic differences in the lists did not produce a significant AC interaction, ($F = 1.41$, $p < .25$). Figure 5.3 demonstrates that the AC interaction is not present at AEWO-1 nor does it increase regularly over the other AEWO levels. The trend toward the AC interaction is present at AEWO-1, disappears at AEWO-2, and is again present at AEWO-4. The similarity in second-order

interactions over the three levels of AEWO resulted in an insignificant ACD interaction (F = 1.25). At both levels AEWO-1 and AEWO-2 both groups recalled more words on the LSC lists than on the MSC lists, and at AEWO-4 this is reversed and both groups recall more of the MSC lists. The only one of these group comparisons of source effects which is significant is the MSC group's performance at AEWO-4 ($t = 3.36$, $p < .01$).

FIGURE 5.2

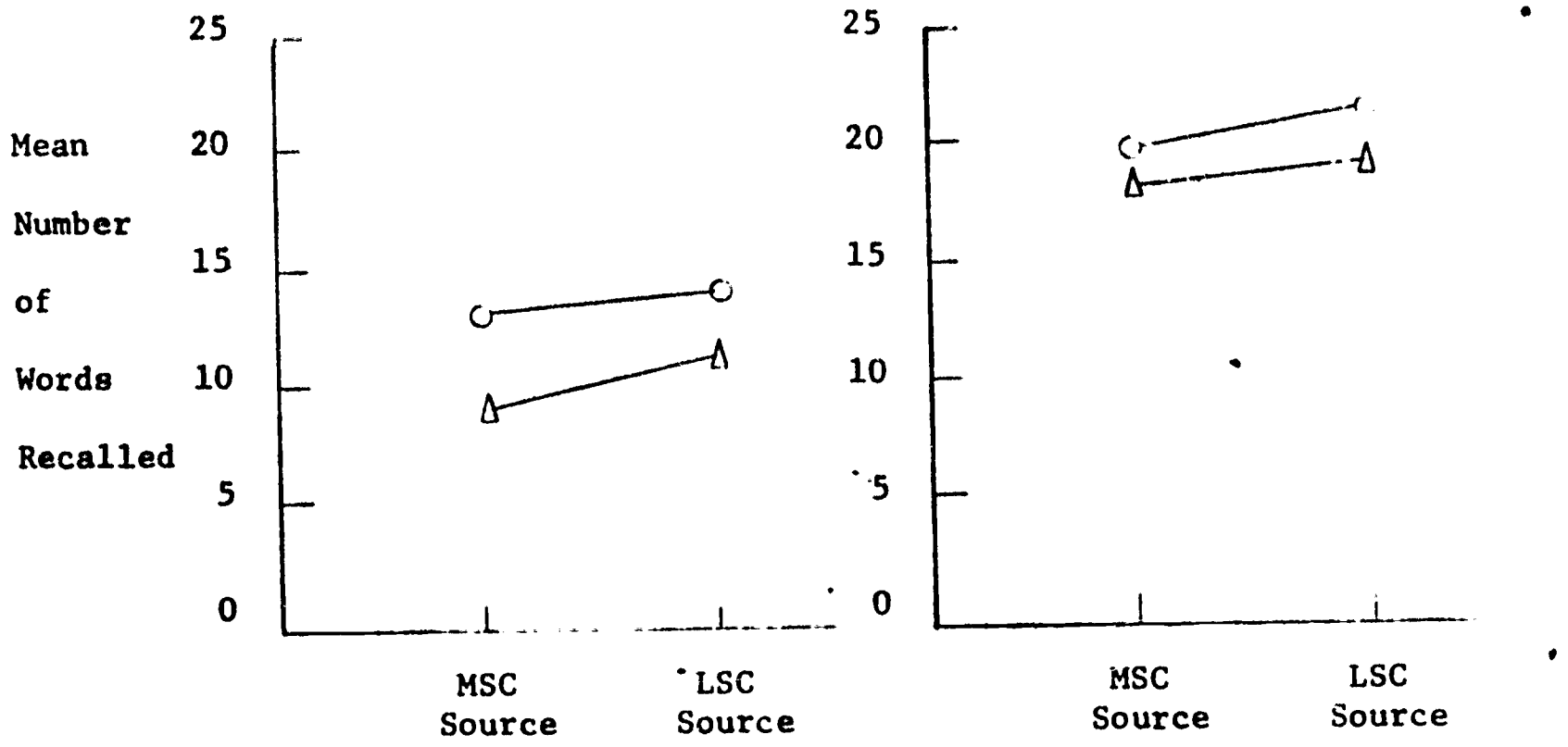
NUMBER OF WORDS RECALLED BY MSC AND LSC GROUPS FROM LISTS OBTAINED FROM MSC AND LSC SOURCES



A second way of presenting the ACD interaction can provide a clue to understanding the dynamics of this interaction. Figures 5.4a and 5.4b show that the group differences are quite constant for lists from both sources, except for one striking exception. The fourth-order LSC lists seem to be particularly difficult for the MSC children.

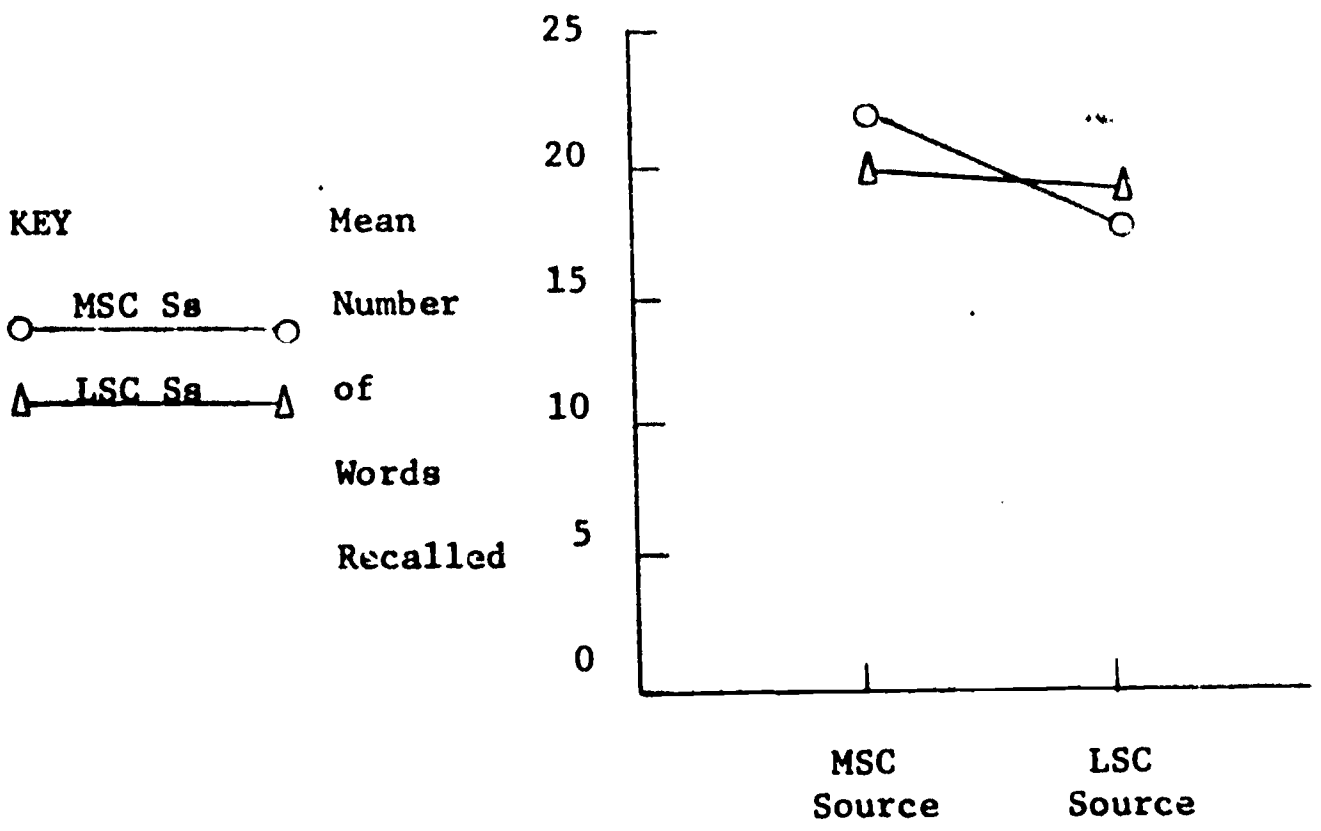
FIGURE 5.3

GROUP BY SOURCE-OF-MESSAGE INTERACTION
AT THREE AEWO'S



3a - At AEWO-1

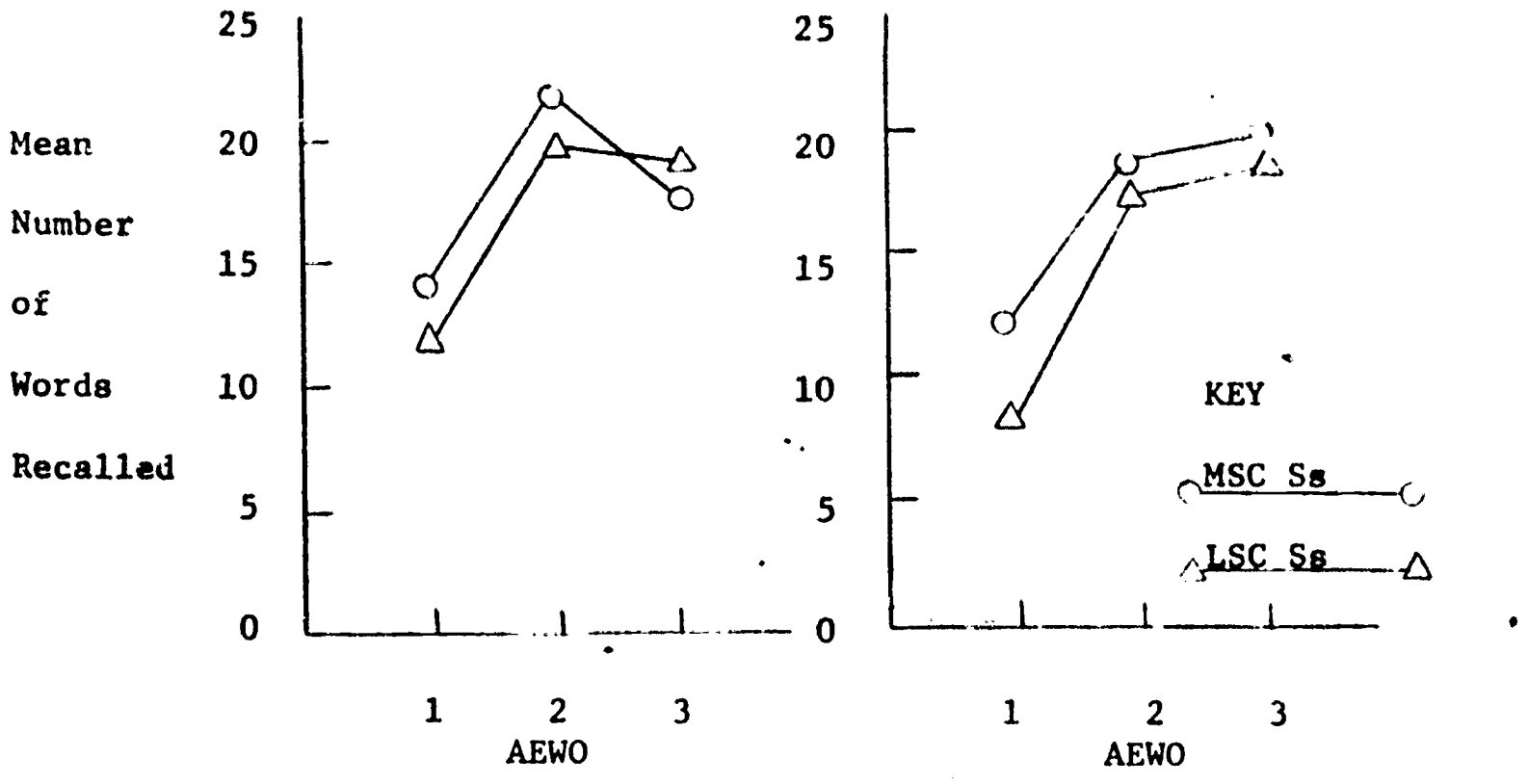
3b - At AEWO-2



3c - At AEWO-4

FIGURE 5.4

GROUP BY AEWO INTERACTION ON LISTS FROM TWO DIFFERENT SOURCES



4a - Lists from LSC Source

4b - Lists from MSC Source

Effects of Two Design Features

Turning now to analyses not directly related to the hypotheses, two features of the experimental procedure can be analyzed for their effects on the dependent variable. It was assumed in planning the statistical test of the hypotheses that these design features would affect both experimental groups similarly, and thus not contribute to a spurious interpretation of the analyses.

Effects of different list orders.--An analysis was done to determine whether the two different orders of stimulus lists affected the dependent variables, or interacted with the other experimental factors. In the experimental procedure both the MSC and LSC groups of Ss were divided into two blocks of twelve Ss each, and a different

list order was used for each of the blocks within a group. The data were analyzed as a 2 x 2 x 2 x 2 analysis of variance with groups and blocks as between-subject sources of variance, and source and speaker of message as within-subject sources of variance. The main effect of blocks accounted for less than one percent of the total within-group variance ($F = .39$). All three simple interactions between blocks and the other factors accounted for little variance and were insignificant. All higher order interactions with the block factor were insignificant except for the triple interaction of block x source of message x speaker of message ($F = 5.99$, $p < .05$). However, since this interaction is of little concern in this research, it can be argued that the effects of block differences did not affect the analyses relevant to the hypotheses.

First and second administration.--Each S was presented twelve stimulus lists in each of two settings to obtain scores on all possible factor combinations. Both groups showed a slight increase in performance from the first to the second administration. The MSC group recalled a mean of 51.0 words from the twelve lists in the first administration, and a mean of 55.4 words from the lists in the second administration. The LSC group recalled a mean of 45.9 and 52.0 words for the first and second administration respectively. The increase is most likely due to the S's acclimation to the testing procedure, since the lists are the same for both administrations. It is encouraging to note that the change between administrations is similar for both groups. Large changes for one group as compared to the other would have raised some doubt as to the reliability and appropriateness of the experimental task.

Digit Span

The digit span test was given twice to both groups of Ss. During the first administration, the numbers were presented by a speaker from the same dialect as the S. During the second administration, the numbers were presented by a speaker from the other dialect.

The results indicate that the speaker did not seem to influence performance on the digit span task. The performance of both groups increased slightly from administration one to administration two. The MSC Ss digit span score increased from 4.96 at administration one to 5.17 at administration two, and the LSC Ss' score increased from 4.38 to 4.71. The size of the increase in both cases seems to be commensurate with the increase between the first and second administration of the word lists. Speaker differences seem to have had little effect because scores rose from the first to the second administration in spite of the speaker differences.

Digit span differences between groups are significant for both administrations. In subsequent references to digit span, the mean of the two digit span scores will be used. The difference between the mean digit span for the two groups is also significant with variances of .64 and .56 for the MSC and LSC groups respectively ($t = 2.32$, $p < .05$).

Additional Factors Influencing Recallability of Lists

Further analyses were carried out in order to determine what additional factors determined the recallability of the lists, and whether or not these factors operated differentially for the two groups of subjects. Three additional factors were investigated

because they have been shown to be important determinants of verbal recall in previous research. They are (1) word frequency, (2) form class of words, and (3) serial-order effect.

Word frequency.--The estimated word frequency for each of the words in the twelve stimulus lists was taken from the Thorndike-Lorge indices (1944). It was the author's intention to relate the mean word frequency for each stimulus list to the mean number of words recalled from that list. This was not done, because the lists varied so little on a word frequency index. All but nineteen of the 180 words in the fifteen lists were classified as occurring more than 100 times per million words. Of these nineteen words, thirteen were in the LSC lists and six were in the MSC lists. But there was so little intra-list variance that an index of mean frequency would have had very little strength in detecting the effects of frequency on recall. This is not to say that there were no source differences in word frequency, but only that the available indices were not sensitive enough to detect differences which might exist.

Form class.--Words are grouped into distribution classes because of similar "privileges of occurrence" within a language. The class membership of a word influences language processing and word retrieval (Brown, 1957; Deese, 1962; Semmel and Herzog, 1966). Differences in form class recall between the two experimental groups in the present research would be of theoretical and pedagogical interest.

All of the words in the stimulus lists were classified into one of nine distributional classes. The form class and the frequency with

which the two groups correctly recalled each word is presented in Appendix II. A summary indicating the percentage of words recalled correctly within each form class is given in Table 5.4.

TABLE 5.4

MEAN RECALL PERCENTAGE FOR WORDS FROM DIFFERENT FORM CLASSES FOR MSC AND LSC GROUPS

	Form Class	MSC Group	LSC Group
1.	Noun (n=37)	34.8%	29.4%
2.	Pronoun (n=27)	32.5	29.3
3.	Verb (n=19)	33.8	28.5
4.	Auxiliary verb (n=29)	21.7	22.3
5.	Adjective (n=19)	28.3	24.6
6.	Article (n=12)	32.3	41.7
7.	Adverb (n=8)	15.7	14.7
8.	Preposition (n=20)	25.8	25.3
9.	Conjunction (n=9)	31.9	26.6

It has been argued that the language of the lower social class deals with more concrete aspects of the environment, whereas the language of the middle class represents more abstract, logical concepts (Bernstein, 1962). Bereiter and Engelmann (1966) have claimed

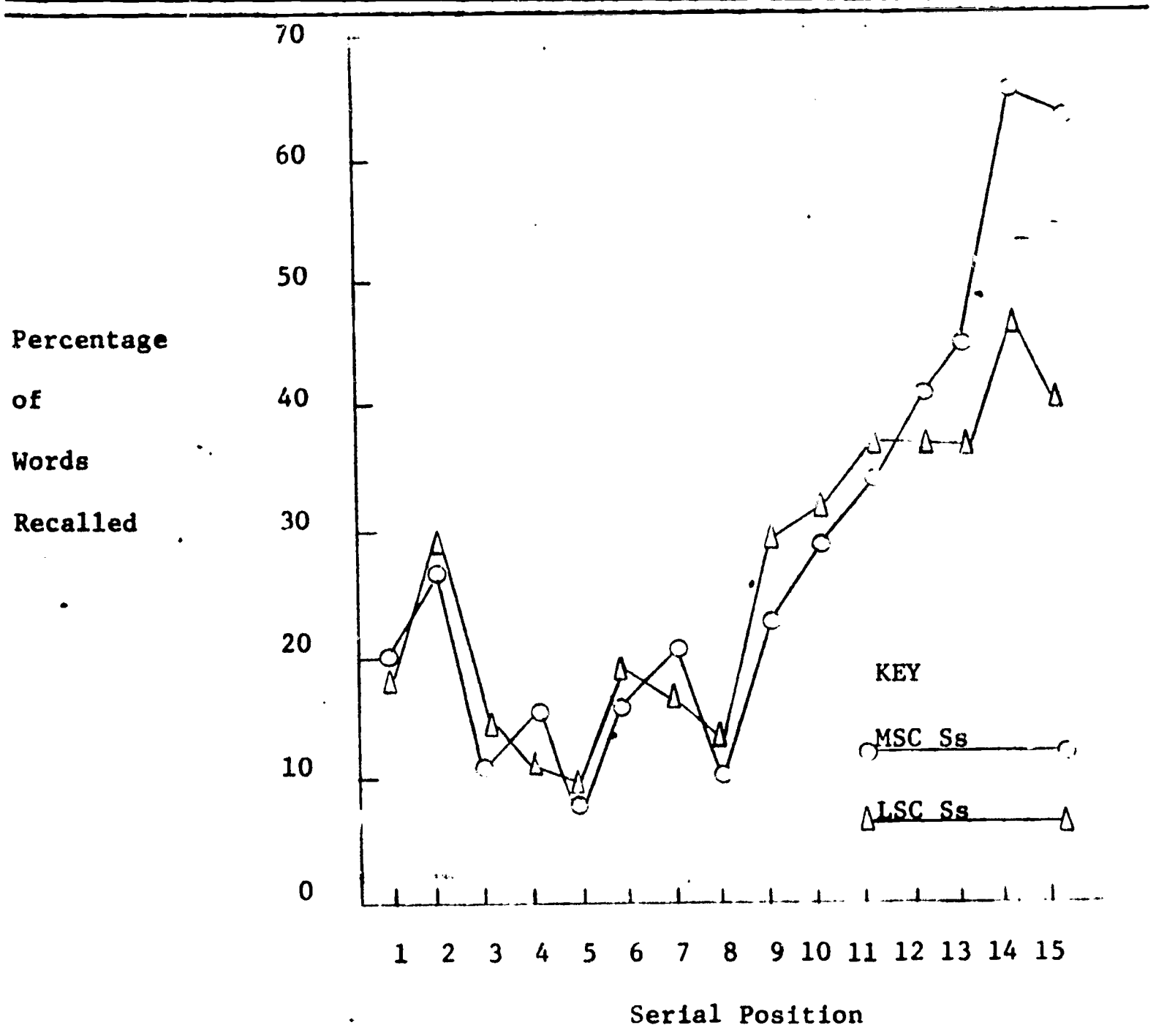
that the lower social class child is particularly deficient in understanding the logical properties of the "function" words in English. One might hypothesize from these claims that the LSC children would remember a higher percentage of "content" words and a lower percentage of "function" words when compared to the MSC group. Table 5.4 indicates no trend in this direction. The percentage differences between groups is small, and the large variance within any form class indicate that these differences would not be reliable. Within each group, performance is rather homogeneous across the different form classes. In summary, form class seems to contribute little to the recallability of words in this task.

Serial position effect.--In learning most verbal materials, the ends of a word list are learned more rapidly than the middle of the list. A comparison of groups on this effect might suggest whether or not these two groups operate similarly in learning verbal material. The number of words remembered in each position by each group for all stimulus lists was calculated from the data in Appendix II and is presented in Figure 5.5.

The position of a word in a list seems to be an important determinant of recallability. Words at the end of the list are remembered more easily than at any other point in the list. The primary deviation from the traditional U-shaped serial position curve is the depression of the first part of the curve in relation to the last part of the curve. Beyond this, very little can be said about the shape of the curve, because many uncontrolled factors produced heterogeneity throughout the lists.

FIGURE 5.5

SERIAL POSITION SCORES FOR
MSC AND LSC GROUPS



The most striking feature distinguishing the curves of the two groups is the increased advantage accrued by the MSC group over the last four positions. Summing over the first eleven positions, the LSC group has a slight advantage which is more than offset by the big differences on the last four positions in favor of the MSC group. The size of the differences indicates that this finding is reliable.

Relationships Among Recall Scores and Indices of Educational Achievement

A correlation analysis was done to show the relationship between the recall scores and other relevant educational indices. Four recall scores, digit span, age, language IQ score, total IQ score, mother's education, and father's education were the ten variables included in the intercorrelation matrix (Table 5.5). IQ scores were available for the MSC group only; some of the variables have missing data.

TABLE 5.5

INTERCORRELATION MATRIX FOR RECALL SCORES, IQ, AND DEMOGRAPHIC VARIABLES

	AEWO-1	AEWO-2	AEWO-4	Total recall	Digit span	Age	Lang. IQ-PMA	Total IQ-PMA	Mother's Education	Father's Education
1. AEWO-1 (n=48)*										
2. AEWO-2 (n=48)	53†									
3. AEWO-4 (n=48)	40	67								
4. Total Recall (n=48)	73	89	87							
5. Digit Span (n=48)	56	37	49	56						
6. Age (n=45)	07	-01	03	03	-01					
7. Lang. IQ-PMA (n=23)	36	40	29	40	30	31				
8. Total IQ-PMA (n=23)	28	29	12	27	07	06	73			
9. Mother's Ed. (n=41)	39	30	02	25	21	06	48	42		
10. Father's Ed. (n=40)	31	32	05	25	28	05	51	52	64	

* This n represents the number of Ss for whom data is available on that variable.

† All decimals have been omitted.

The recall scores at the three AEWOs exhibit considerable independent variance. Recall at AEWO-1 correlates .53 with recall at AEWO-2 and .40 with recall at AEWO-4. AEWO-2 recall scores correlate .67 with AEWO-4.

Within the MSC sample, moderately small correlations were found between recall variables and IQ scores. The three recall and total recall scores consistently correlated higher with the language IQ score than the total IQ score.

The memory span of the Ss shows moderate correlations with recall scores, indicating that the recall tasks are measuring something in addition to simple memory span. The correlations between digit span and recall score at level AEWO-1 is somewhat higher than recall at either AEWO-2 or 4, giving some support to the argument that the higher order lists require abilities less dependent on memory span.

Summary of Analysis

The hypotheses were tested by analyzing some of the interactions among four sources of variance acting on the dependent variable. Hypothesis One received partial support; Hypotheses Two and Three were not supported.

Three other analyses were made on aspects related to the experimental design. The block differences, defined by two different list orders, were small and did not interact with any of the terms used in testing the hypotheses. The performance increased slightly from the first and second administration for both groups. On the digit span task, the MSC group scored significantly higher than the LSC group but speaker effects were not observable.

Three additional factors which might have affected the recallability of stimulus lists were analyzed. The two experimental groups were compared to determine whether these factors affected both groups similarly. An index of word frequency did not have enough between list variance to contribute information about the affect of word frequency on recall. The form class of words did not seem to be a significant factor affecting recall, nor did this factor affect the two groups differently. The serial position of a word in a list seemed to be a rather significant factor in determining the recallability of a particular word, although each position showed a large variance. The serial position recall curve was similar for both groups from positions one through eleven, but the MSC group remembered increasingly more words than the LSC group in positions twelve through fifteen.

CHAPTER VI

DISCUSSION OF RESULTS

Concerning Phonetic Effects

The strength and direction of support for Hypothesis One more clearly defines the effects of dialect differences on interpersonal communication. The performance of the MSC group of Ss was sharply reduced by hearing a message presented by a speaker of a different, but closely related, dialect. The performance of the LSC group was not significantly reduced when presented with messages by a speaker with a dialect unlike their home dialect. Both findings have some intuitive support, but the latter finding runs counter to recent writings on the effects of bidialectical environments (Bernstein, 1961; Riessman, 1962).

The findings seem reasonable in light of the fact that the MSC Ss had very little previous exposure to the other dialect used in the experimental task, whereas the LSC Ss had been continually exposed to both the dialect of their home and the MSC dialect form. Most of the adult figures in the school, with whom the LSC child had contact, speak a dialect with phonetic features like that of the MSC speakers. Radio announcers and particularly television characters speak the standard dialect of the MSC speakers. It could perhaps be empirically demonstrated that on many days the number of words the LSC child hears in his home dialect is exceeded by the number of words he hears in the standard dialect from teachers, the radio and television.

A failure to find a decrement in the performance of LSC Ss on MSC-presented lists emphasizes the importance of distinguishing between "decoding" and "encoding" processes. The LSC Ss encode verbal messages which have phonetic features more like the messages from the LSC speakers than those from the MSC speakers. But yet they were able to decode the MSC-presented messages slightly better than the LSC-presented lists. It is a mistake to assume that a child cannot decode the meaning of a message because he does not produce (encode) messages with linguistic features similar to the presented message. As an example, in the case of phonetic differences, it is a mistake to infer that because a child never produces a postvocalic /r/ he cannot readily understand a word spoken with a postvocalic /r/. In the usual case, with the one language--one dialect speaker, the phonetic features of the decoded and encoded messages are very similar. But the phonetic features of the encoded and decoded messages are different for the person who regularly hears messages from two dialects, but speaks only one of the dialects.

Interference in communication between two speakers need not be inferred simply because the linguistic features of their speech production are different. An investigation of decoding processes is necessary in order to assess the effects of dialect differences. A structural description of social dialect differences can provide clues as to possible sources of interference, but the description, in itself, provides no definite answers to questions regarding the language decoding abilities of a particular dialect speaker. Based on the linguistic descriptions, experimental situations must be devised to measure the effects of communicating in different dialects. Using Ss from different dialects, intra-dialect scores can be compared to inter-dialect scores on measures of message intelligibility and message recallibility. As an example,

a task could be devised in which Ss from dialect "one" would be asked to verbally instruct Ss from both dialect "one" and dialect "two" on a problem solving task. Measures of success in communicating instructions could be calculated and intra-dialect vs. inter-dialect success compared. Through such research, the effects of dialect differences on decoding could be interpreted.

The question can be raised,"Why did not the LSC group perform better on the LSC-presented lists than on the MSC-presented lists?' The simplest kind of answer would be that there was some quantitative, phonetic property of the LSC lists which made them less intelligible than the MSC-presented lists even to the Ss whose home dialect more closely matched the LSC speakers. It could perhaps be demonstrated that there were tone, stress, and other supra-segmental differences which increased recall in favor of the MSC speakers. The LSC speakers were not as proficient at reading as were the MSC speakers, and as a result the rhythm of spoken words is not as smooth for the LSC-presented lists, although the total elapsed time is the same. These kinds of objective, phonetic features could account for part of the decrement observed on LSC-presented lists.

A second possible answer to explain the relatively low performance of the LSC Ss on LSC lists involves a consideration of the effects of experimenter's race on motivation and attention. To review, the examiners were both Caucasian and the LSC Ss were all Negro. The effects of testing Negro children with Caucasian examiners cannot be answered simply. Katz (1964) has pointed out that in testing Negroes the type of information given the S and the nature of the task both interact with the race of the examiner. Katz and Greenbaum (1963) showed that under mild threat conditions Negro college students performed better

on a digit-letter substitution task under white examiners than under Negro examiners. But under strong threat, the performance with white examiners was less than with Negro examiners. It was suggested that white examiners produced more subject anxiety than Negro examiners, but that under mild threat conditions this increased anxiety resulted in increased performance. But the added anxiety resulting from the strong threat resulted in too much anxiety and a subsequent decrement in performance.

The implications of Katz's work for the present research are not clear because he used college students and tasks which were unlike those used in this research. But a probable hypothesis could be developed on the basis of Katz's work and the findings regarding Hypothesis One. In the life of most Negro children, academic performance and achievement tasks are associated with Caucasians. Negro adults are associated with casual, less achievement-oriented settings. The "set" produced by the Negro voice may be less conducive to performance on an achievement-oriented task than the set produced by the voice of a Caucasian. A possible hypothesis is that the performance on a recall task will be less for Negro children when the stimulus materials are presented by a Negro speaker than by a Caucasian, provided that the Ss are equally familiar with the linguistic patterns of both speakers. This research cannot, of course, be cited as support for this hypothesis. But an attention or motivational factor should be considered in any subsequent research on the effects of phonetic differences.

Concerning Source Effects

The two source effects under consideration in this research correspond to a semantic and a syntactic component. The failure to find significant interactions on these factors was perhaps due to the procedure used to measure the effect rather than to the absence of a real effect. Two aspects of the procedure resulted in weakening the test of the hypothesis. First, the women selected to provide the AEWO samples were apparently biased toward the middle social class in comparison to the whole community. The education and occupation indices for the adult sample were more middle-class than the same indices for the parents of the LSC Ss. Second, the AEWO procedure of collecting language samples produced lists which represent the subject's most formal style. In the case of the LSC person, the formal speaking styles resemble more closely the MSC dialect. Labov (1964) showed that the presence of distinctive phonetic features in the speech of LSC Ss varied according to the setting in which samples were obtained. Speakers of a deviant dialect approximated the standard dialect most closely when they were asked to read word lists. From Labov's work, one would infer that the samples collected in the present research represent a style which is closer to the MSC dialect than would be obtained if the language samples were taken in a more informal setting.

The AEWO method of obtaining language samples was used because it generates levels of intra-list structure which permitted the observation of the effects of structure as an independent variable. More informal methods of sample selection might have produced better dialect samples, but levels of structure are more difficult to define in samples collected more informally.

It might be argued that if one is interested in the effects of dialect differences, a more direct method of obtaining stimulus materials is preferable to a sampling procedure. For example, one could select those phonetic, syntactic, and semantic features of the dialects under study which best distinguish between them. Test samples could then be selected which contain these features, or, artificial dialect samples could be generated which contain a high concentration of those features which distinguish between the dialects under study. Subjects from both dialect groups could then be tested on samples from both dialects in a recall or intelligibility task, and the group by dialect interaction analyzed. This method would have the dubious advantage of producing more statistically significant results, but have the disadvantage of being unable to generalize to any actual language settings. An investigation of the psychological effects of dialect differences must take into account the "dosage" of the independent variable if the findings are to obtain generalizability. The linguistic differences which distinguish between dialects may have little effect on communication as long as these differences are scattered throughout the message. The contextual cues provided by the similarities between two given dialects may minimize the effects of the linguistic dissimilarities between the two dialects. However, if these differences are concentrated in one message, it could be demonstrated that the receiver would have much more difficulty decoding the message. But this information would contribute little to an understanding of the effects of communicating in different dialects in actual settings.

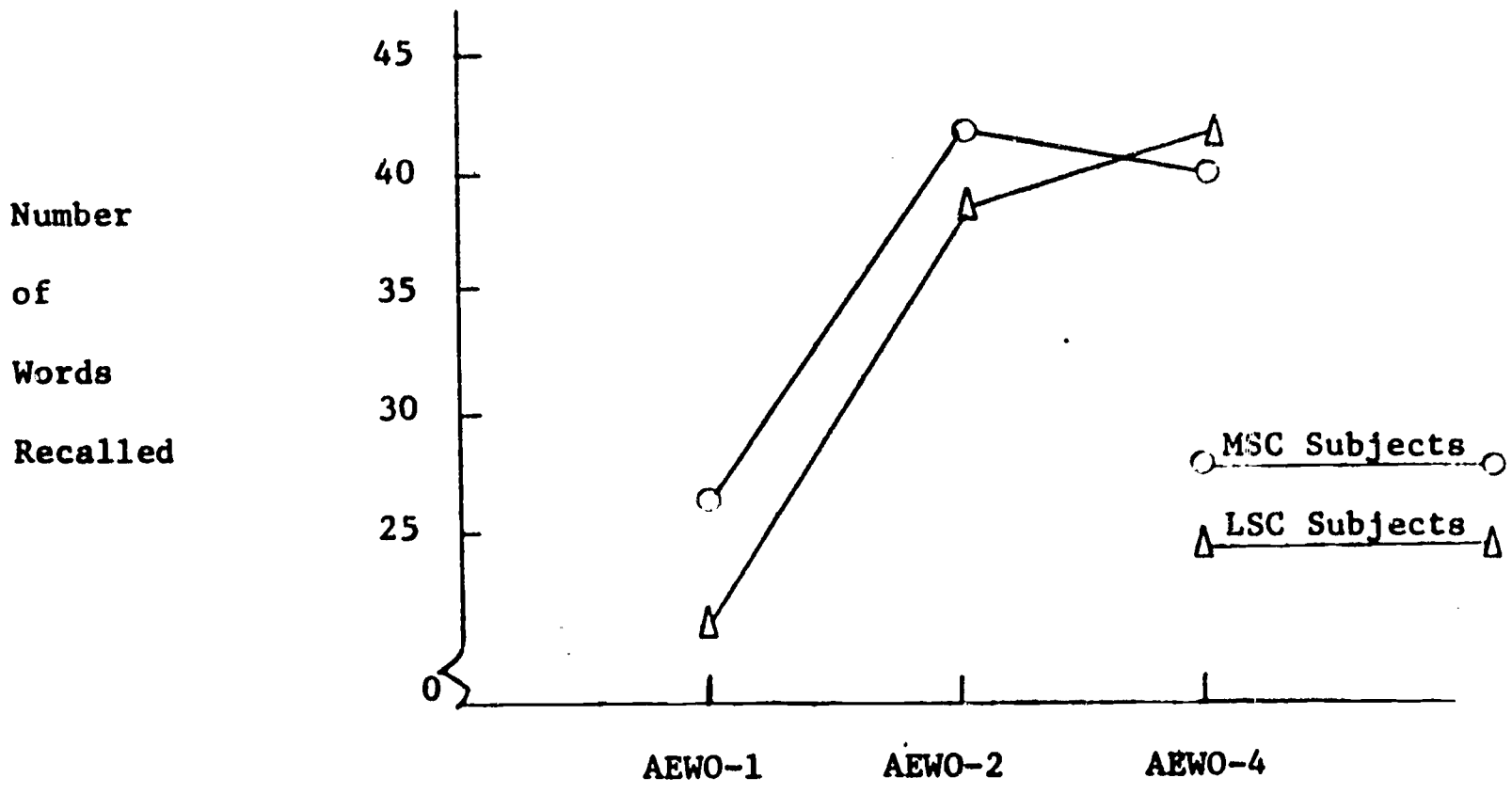
Some Serendipitous Findings

Four of the interactions in the four-way analysis of variance, which were not directly related to the hypotheses, were significant (see Table 5.3). The groups factor interacted with AEWO (AD, F = 3.56), the speaker and source factors interacted (BC, F = 12.06), the source by AEWO factor was significant (CD, F = 9.35), as was the third-order interaction, speakers by source by AEWO (BCD, F = 8.62).

The most interesting interaction from the standpoint of theory, indicates that the difference in the performance of the LSC and MSC groups was not the same over the different levels of AEWO. Figure 6.1 illustrates that the LSC group remembered fewer words than the MSC group at AEWO-1, but more words at AEWO-4. In other words, the LSC group seems better able to make use of the structure in the task.

FIGURE 6.1

NUMBER OF WORDS RECALLED BY LSC AND MSC GROUPS FOR THREE APPROXIMATIONS-TO-ENGLISH-WORD-ORDER



A case could be made for an interaction in the direction opposite of that which was found, that is, with the advantage in favor of the MSC group increasing as the AEWO increased. One could point to the literature reviewed earlier which indicates that the language of the lower social class Negro is less structured, and that his intellectual performance on structured language tasks is far below the mean of his Caucasian counterpart. This evidence would indicate that on a basic skill such as memory span for words or digits the LSC group would be at a lesser disadvantage than on tasks which required the utilization of linguistic structure. However, the data indicates that the LSC children were at a significant disadvantage on the digit span task and the AEWO-1 recall task.

The group by AEWO interaction which was found could be explained in terms of the differences in background experience with this kind of learning task. The Negro, LSC subject has perhaps had very little experience with verbal learning tasks which involved nonsense materials. His experiences which most closely resemble the experimental task are probably the rote verbal learning required in school. The MSC subject, however, more frequently engages in word skill games at home which require the manipulation and memory of words without regard to the meaning of the task. These kinds of experiences may well provide the MSC subject with an advantage in a task like the recall of AEWO-1 lists, but this advantage decreases as longer, meaningful phrases are included in the task. Some support is given this explanation by an observation reported by the test scorers. It was reported that the Negro, LSC subjects tended to recall words from the presented lists in the context of a meaningful sentence, or in a couple of cases, the words of a list

were woven into short stories. MSC Ss may be more used to performing nonsense tasks required in this experiment, as well as in IQ tests.

The similarity in performance at AEWO-2 and AEWO-4 for both groups is worthy of a parenthetical note. Other research with the AEWO method reported earlier indicated that adults were able to recall a small, but significantly greater, number of words from AEWO-4 lists than from AEWO-2 lists. With the first grade children in this research there is very little difference between performance at levels AEWO-2 and AEWO-4. Apparently, the contextual constraints beyond two words does very little to increase recall for these young children.

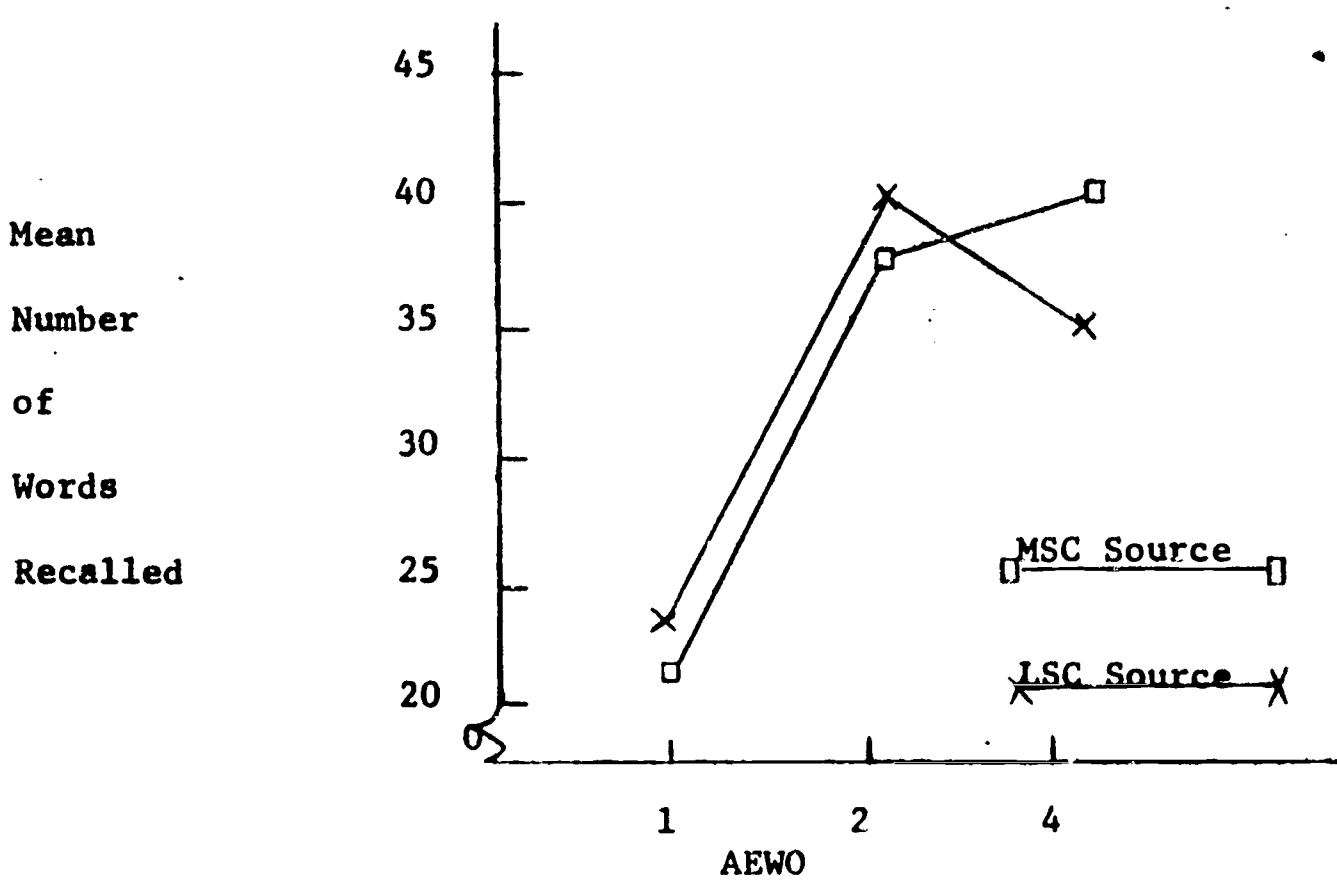
However, an intuitive judgment on the stimulus lists seems to indicate that the AEWO-2 lists may be easier to remember than the mean of a collection of such lists. The repetition of a two word phrase in both LSC-2A and LSC-2B as well as some phrases greater than two words long in MSC-2A and MSC-2B indicates that chance factors produced second-order lists which were particularly easy to remember. Any future research of this kind using the AEWO method should build into the collection procedure a method for controlling these factors.

The significant CD (source x AEWO) interaction ($F = 9.35$) indicates that differences in list difficulty for lists collected from different sources is also not the same over the levels of AEWO (see Figure 6.2). The fourth-order lists collected from the LSC source were more difficult for both groups than the corresponding fourth-order lists from the MSC source. The syntax of the fourth-order LSC lists seems to be more irregular than the corresponding MSC lists. This is probably not a reflection on the syntax of the LSC speakers, but rather manifests the difficulty many women from the LSC source-group had in producing the

fourth-order strings. Often the LSC women produced sentences with rather distorted syntaxes in order to incorporate the three-word string presented to them. This could result in a greater source difference in difficulty between lists at AEWO-4 than at the other levels.

FIGURE 6 2

RECALL PERFORMANCE ON LISTS FROM MSC AND LSC SOURCES AT THREE AEWO'S



The significant BC (speaker x source) interaction (F = 12.06) indicates that Ss remembered more of the MSC lists when they were presented by MSC speakers and more of the LSC lists when they were presented by LSC speakers. This finding, in itself, has a rather intuitive validity based on the notion that the LSC list presented by the LSC speaker "go together" better than the LSC list presented by the MSC speaker, and likewise with the MSC lists. But the significant BCD (speaker x source x AEWO) interaction (F = 8.62) indicates that this BC interaction

is not the same over the three AEWO levels. Figure 6.3 illustrates that the interaction is present in strength at AEWO-2, but that the interaction is not present at AEWO-1 and AEWO-4. Any intuitive notion about speaker and list going together can hardly explain this distinction.

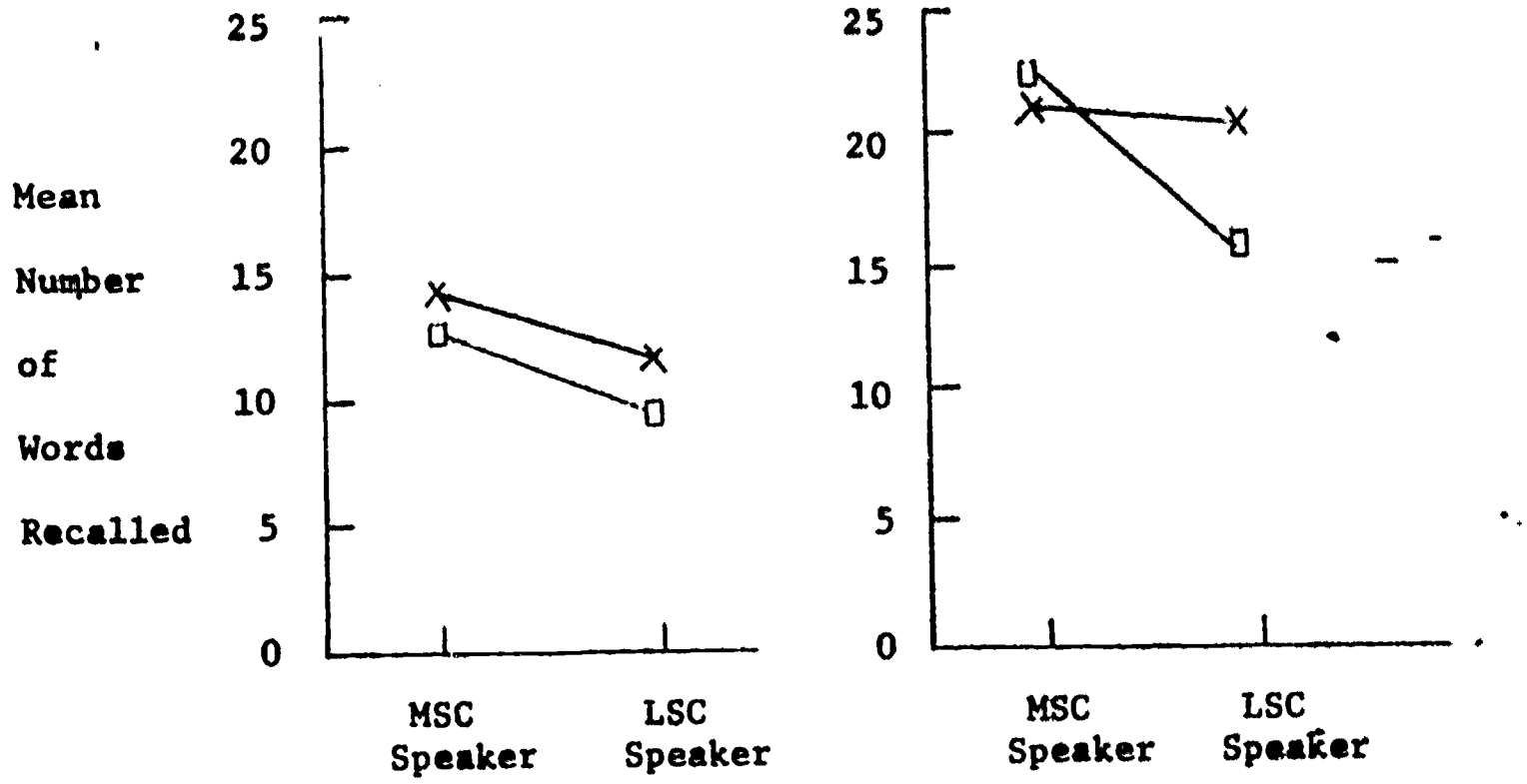
Summary of Problems in Doing Research on the Psychological Effects of Dialect Differences

Competence vs Performance.--The language competence of a person is manifested in his language performance, but many aspects of competence are not revealed in any given description of performance. The observer can obtain only a partial glimpse of a subject's competence by analyzing a particular performance. Many aspects of language competence may never be observed in language output. Research which is concerned with the pedagogical implications of different social dialects in the same educational setting must go beyond the description of performance. Research and evaluation techniques must be developed which assess a person's ability to understand the linguistic features of a message.

Styles.--People have definably different styles of speaking depending on the social context. Two kinds of problems are raised by this fact and must be dealt with by the student of social dialects. First, if it is his purpose to obtain a linguistic description of the language of a dialect community, the researcher will find it difficult to obtain samples of the more informal language styles because most interviewing situations bring out the more formal style. Second, if the researcher intends to make inferences about a person's ability to understand a message presented in a formal style, he must not be misled into conclusions based on a description of the Ss informal style

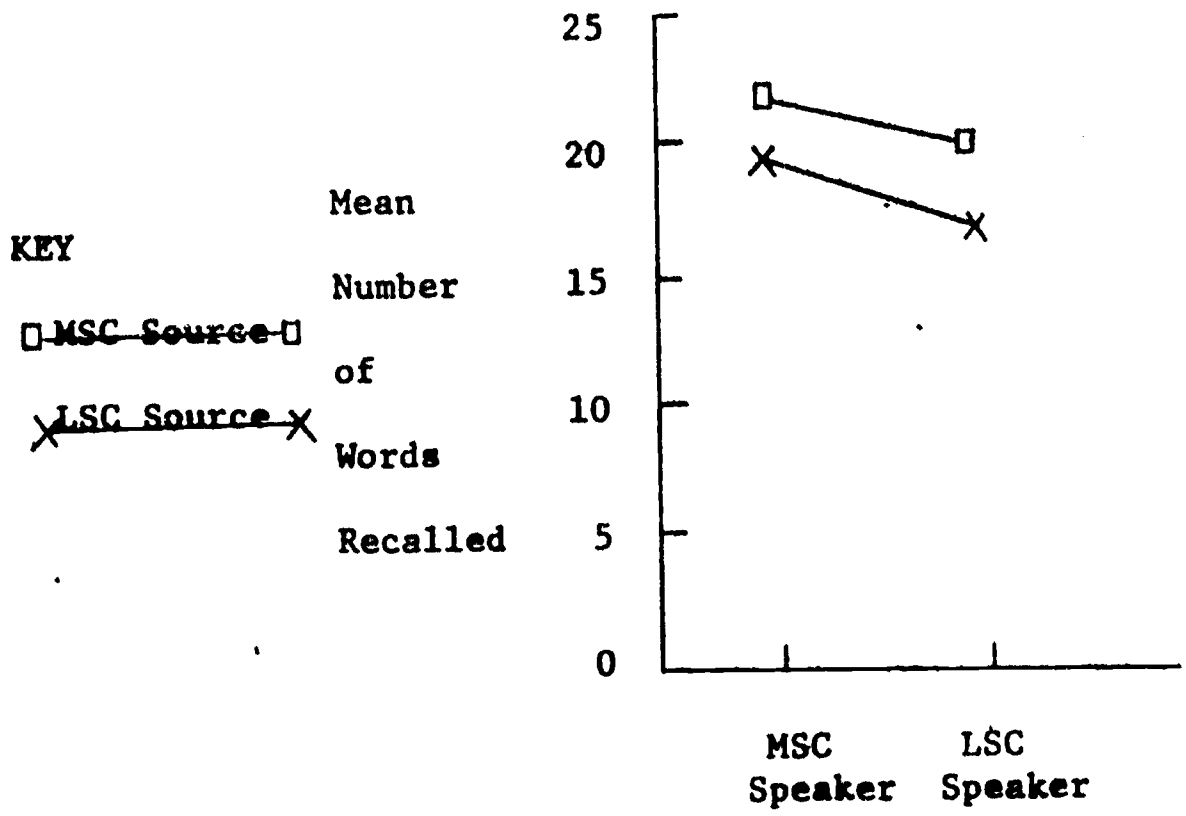
FIGURE 6.3

SPEAKER BY SOURCE INTERACTION
AT THREE AEWO'S



3a - At AEWO-1

3b - At AEWO-2



3c - At AEWO-4

of speech production. The encoding and decoding aspects of language production must both be investigated in order to obtain a complete picture of the effects of dialect differences.

Perceptual and affectual factors in language.--The meaning of a message to a person is a function of more than just the sound patterns with which that message can be identified. To analyze the psychological effects of dialect differences, it would be a mistake to look at the perceiver only as an information processing machine with perception and understanding defined in terms of the definable linguistic features of a message. Every person has a learning history which has conditioned certain affective responses to linguistic features. These affective responses to language interact with the perceptual responses to determine the influence of a particular message. In this research, the perceptual and affectual influences on the dependent measure were confounded. In order to answer the questions of educational significance which are related to the issue of social dialects, methods must be found for separating and measuring these different effects. Such information must be obtained in order to answer crucial educational questions such as: (1) Should educators attempt to eradicate the non-standard dialects from school settings? (2) Should children who speak a non-standard dialect be taught the standard dialect as a second dialect? (3) What are the factors which facilitate learning a second dialect by children and by adults? (4) To what extent does the non-standard dialect speaking child understand messages presented in the standard dialect? All of the answers to these questions require an analysis of both the perceptual and affective factors in language learning.

CHAPTER VII

SUMMARY

The purpose of this study was to investigate the effects of communicating in different social dialects, with particular concern for making inferences to educational settings. Furthermore, the study was intended to investigate separately the influence of phonetic, syntactic, and semantic dialect differences on communication between persons from different dialect communities. It was argued that dialects are defined in terms of distributional differences in the frequency and structure of their phonetic and semantic elements, and that a person's ability to process natural language is directly related to the degree to which the features of a message match the distributional features of his own dialect. The three hypotheses stated that phonetic, syntactic, and semantic features of dialect differences would each contribute to restrictions on the amount of information transmitted between members of different dialects.

Race, social class, and place of birth were the primary indices used to select a group of adults and children from each of two dialect populations. The group labeled LSC were Negro, lower social class, and born in the South. The MSC group were Caucasian, middle social class, and born in the East or Midwest. Fifteen women, aged 25-40, comprised the adult groups; twenty-four first grade children between 75-87 months of age made up the groups of children.

Language samples at three approximations-to-English-word-order were obtained from both groups of adults. These samples served as stimulus materials for an immediate recall task with the two groups of children. Each stimulus list was presented by two speakers from each of the dialect groups to each subject. Each stimulus presentation was defined by three factors: (1) the speaker; (2) the source from which it was collected; and (3) its approximation-to-English-word-order.

The hypotheses were tested by analyzing the amount of variance in list recall produced by these three factors for each group of subjects. The effect of phonetic differences, predicted in Hypothesis One, was significant for the MSC group but not for the LSC group of Ss. MSC Ss remembered less of the lists which were presented by the LSC speakers, but there was no significant difference in the recall of the LSC subjects on lists presented by MSC and LSC speakers. It was concluded that the exposure of the LSC Ss to MSC dialects through school and the mass media had developed their facility to perceive messages in this dialect, and thus prevented a decrement in performance on the MSC-presented lists. Those concerned with the study of subcultural dialects should be cautioned by this data not to make inferences about the decoding abilities of the dialect speaker from the phonetic descriptions of the speaker's verbal output.

The effects of source differences, predicted in Hypotheses Two and Three, were not clearly observable in the data. Both groups did remember more words from lists which were collected from their home

source, producing a nonsignificant trend in the hypothesized direction. The interaction trend was most obvious on the most highly structured lists (AEWO-4), lending some equivocal support to the contention that structural features of the LSC lists were operating differentially on the two groups. Two aspects of the experimental design worked against the support of Hypotheses Two and Three. The adult women who supplied the LSC lists were a middle-class biased sample of the community, and the method of collecting language samples elicited a formal style of speech.

Two findings not directly related to the hypotheses seem worthy of further investigation. First, a significant group by task level (AEWO) interaction resulted from a decreasing difference in recall performance between MSC and LSC groups as the structure of the stimulus lists increased. The increased "meaning" of the higher-order lists seemed to benefit the LSC Ss more than the MSC Ss. Second, a striking difference in the serial position learning curve was observed for the two groups. This finding could contribute to a description of the differences between the learning paradigms utilized by these two educational groups.

APPENDIXES

APPENDIX I - PHONETIC TRANSCRIPTIONS OF STIMULUS LISTS PRESENTED BY MSC AND LSC SPEAKERS

List MSC-1A

Speaker								
MSC-1--	sey	čay$^{\bullet}$ld	dawn	ðɛr	nɪr	ar	ay	kɔrnɻ
LSC-1--	sey	čal	dawn	ðɛr	nɪr	a·>	<a·	kondɻ
MSC-2--	sey	čayld	dawn	ðɛr	nɪr	ar	ay	kornɻ
LSC-2--	sey	ča·l	dawn	ðɛr	nɪr	ar	a·	kowndɻ
	wi	puwəl	ey	awər	ʌv	kʌmiŋ	may	
	wɪy	pul	ɛɪg	awə	ʌv	kʌmɪn	ma·	
	wi	puwl	ey	awr	ʌv	kʌmɪŋ	may	
	wi	puwl	ey	arɻ	ɔwf	kʌmɪn	ma·	

List MSC-1B

MSC-1--	ʌv	lɪtl	maws	tuw	wɪl	kæt	ɛrpleynz
LSC-1--	ʌ	l·	mæws	tuw	wɪəl	kɛt	ə$^{\circ}$pleyn
MSC-2--	ʌv	lɪtl	maws	tuw	wɪl	kæt	ɛrpleynz
LSC-2--	ʌ·v	lɪl	maws	tuw	wɪl	kɛt	ə$^{\circ}$pleynz
	end	wɛn	ɪz	vɛrɪ	prɪti	ay	hi	grin
	ɪən	hwɛ$^{\circ}$n	ɪ$^{\circ}$z	vɛrɪ	prɪt·ɪ	æ	hi	grin
	ɛnd	wɛn	ɪz	vɛrɪ	prɪti	ay	hi	grin
	ɪndz	wɪn	ɪ$^{\circ}$z	vɛrɪ	pɪrdɪ	a	hi	grin

List MSC-2A

MSC-1--	ðə	bɻd	fluw	sawθ	ɪn	ðə	čɛr	ɪz	blæk
LSC-1--	ðʌ	bʌrd	fl^{ɪ}u	sæwθ	ɛn	ðʌ	č^{ɪ}ɛr	ɪəz	blæk
MSC-2--	ðʌ	bɻd	fluw	səwθ	ɪn	ðʌ	čɛr	ɪz	blæk
LSC-2--	ðʌ	bɻd	fluw	sæwθ	ɪn	ðʌ	č^{ɪ}ɛr	ɪ$^{\circ}$z	blæk
	gawn	wəz	səprayzed	bay	ey	stor			
	ga^{n}w^{n}	wɔz	səpræz	bæ	ey	stu$^{\circ}$			
	gawn	wəz	səprayzd	bay	ey	stor			
	gawn	wɔz	səpræz	bæ	ey	sto$^{\circ}$			

APPENDIX I (cont.)

Speaker				List MSC-2B				
MSC-1--	ðə	gɻlz	ǰoynd	ʌðɻz	ɪn	ðə	skuw^{ə}l	ɪz
LSC-1--	ðʌ	gɻlz	ǰɻn	ʌðɪz	ɛn	ðɪ	skuwl	ɪz
MSC-2--	ðʌ	gɻlz	ǰoynd	ʌðɻz	ɪn	ðʌ	skuwɪ	ɪz
LSC-2--	vʌ	gɻz	ǰɻn	ʌðəz	ɪn	ðʌ	skuw	ɪ^{ə}z
	prɪdi	feys	wəz	əfreyd	ʌy	vɛlvɪt	ænd	
	prɪt'ɪ	feys	wɔz	efreyd	əf	vɛvɪt	æn	
	prɪti	feys	wəz	əfreyd	ʌv	vɛlvɫt	ænd	
	prɪdɪ	feys	wɔz	efrey^{ɪ}d	ɔv	vɛvrɪ	æ^{ɪ}n	

	List MSC-4A						
MSC-1--	læst	ivnɪŋ	ðæt	læmp	ɪn	ðʌ	lɪvɪŋrum
LSC-1--	læst	ivɪn	ðæt	læmp	ɪn	ðʌ	lɪvɪnrum
MSC-2--	læst	ivənɪŋ	ðæt	læmp	ɪn	ðʌ	lɪvɪŋrum
LSC-2--	læ^{ɪ}st	ivnɪn	ðɛt	læ^{ə}mp	ɪ^{ə}n	ði	lɪvɪnrum
	stændz	nir	ðʌ	dor	wɛn	ay	kem	ðæt
	stændz	nir	ðʌ	do^{ə}	hwɛn	a	kæ^{ɪ}m	ðɛt
	stændz	nir	ðʌ	dor	wɛn	ay	kem	ðæt
	stænz	nir	ði	dowə	wɛn	a·	keym	ðæt

	List MSC-4B							
MSC-1--	ðʌ	bušɪz	əntɪl	fɔl	ar	kænsld		ɪmidiətli
LSC-1--	ðʌ	bušɪz	əntɪ^{ə}l	fɔwl	ɔ	kæ^{n}w^{n}sɻ		əmɪdlɪ
MSC-2--	ðʌ	bušɪz	əntɪl	fɔl	ar	kænsɻd		ɪmidiətli
LSC-2--	ðʌ	bušɪz	əntɪl	fɔwl	ar	kæ^{n}sɻt		əmidɪli
	bikʌz	hi	wəz	wiθ	hr$_1$	hwɛn	ðʌ	tɛləfon
	bɪkɔwz	hi	wɔz	wi^{ə}θ	hr$_1$	hwɛ^{ə}n	ðʌ	tɛləfɔ^{n}
	bikʌz	hi	wəz	wɪθ	hr$_1$	hwɛn	ðʌ	tɛləfon
	bikɔwz	hi	wɔz	wɪθ	hr$_1$	wɛn	ði	tɛlɪfon

APPENDIX I (cont.)

Speaker — List LSC-1A

MSC-1--	mi	béybi	æm	ay	wey	ðʌ	béysmɛnt	ðɛm
LSC-1--	mi	béybi	æm	a	wɛy	ðɪ	béysmnt	ðɛ^{ə}m
MSC-2--	mi	béybi	æm	ay	wey	ðʌ	béysmɛnt	ðɛm
LSC-2--	mi	béybi	æ^{ə}m	a	wey	ðʌ	béysmɪnt	ðɛm

mórnɪŋ	tuw	kʌm	áwɻ	wəz	mi	ay
mɔrninz	tuw	kʌm	a	was	miy	a
mórniŋ	tuw	kʌm	áwɻ	wəz	mi	ay
mórniŋ	tuw	kʌm	áwə	wɔz	mi	a

List LSC-1B

MSC-1--	ar	gówɪŋ	gow	əlʌ́mnay	lɪv	kúkiñ	wud
LSC-1--	a	gówɪn	gow	əlʌ́mbay	lɪ^{ə}v	kúkɪn	wu^{ə}
MSC-2--	ar	gówɪŋ	gow	alʌ́mnay	lɪv	kúkɪŋ	wud
LSC-2--	ɻ	gówɪn	gow	əlʌ́mnay	lɪ^{ə}v	kúkɪn	wu^{ə}

dawn	ay	mʌč	ʌ́ðɻz	vɛrɪ	ɪz	haws	pɛ́rənts
dawn	a	mʌs	ʌ́ðəz	vɛrɪ	ɪ^{ə}z	haws	pɛrə́^{n}s
dawn	ay	mʌč	ʌ́ðɻz	vɛri	ɪz	haws	pɛ́rɛnts
dawn	a	mʌs	ʌ́ðɪz	vɛrɪ	ɪ^{ə}z	haws	pɛ́rə^{n}s

List LSC-2A

MSC-1--	æ^{ə}nd	ay	æm	gówɪŋ	may	arm	ar	yuw	ar
LSC-1--	æ^{ɪ}n	a	æ^{ə}m	gówɪn	ma	ɔ·m	a	y^{ɪ}uw	a
MSC-2--	ænd	ay	æm	gówɪŋ	may	arm	ar	yuw	ar
LSC-2--	æ^{ə}n	a	æ^{ə}m	gówɪn	ma·	ɔ·m	ɻ̥	yuw	ɻ̥

yuw	wud	yuw	kæ^{n}t	gow	tuw	
y^{ɪ}uw	wud	y^{ɪ}uw	kænt	gow	tuw	
yuw	wud	yuw	kæ^{n}t	gow	tuw	
yuw	wud	yuw	kæ^{n}t	gow	tuw	

APPENDIX I (cont.)

Speaker

List LSC-2B

MSC-1--	ɪn	ðʌ	howm	tumárow	ɪt	ɪz	ðɪs	ɪz	yuw
LSC-1--	ɛn	ðɨy	howm	temárə	ɪt	ɨz	ðɨs	ɨz	yˡuw
MSC-2--	ɪn	ðʌ	howm	temórow	ɪt	ɪz	ðɪs	ɪz	yuw
LSC-2--	ɛn	ðʌ	howm	tumáro	ɪt	ɪ•z	ðɪs	ɪ•z	yuw

ar	yuw	ar	nat	gow	tuw	
a	yˡuw	a	nat	gow	tuw	
ar	yuw	ar	nat	gow	tuw	
ɻ	yuw	ɻ	nat	gow	tuw	

List LSC-4A

MSC-1--	ɪz	ɪn	évrɪ	θɪŋ	hi	dʌz	dʌ́zn̩t	névɻ
LSC-1--	ɨz	ɛn	évrɪ	θɪŋ	hi	dəz	dəźzn̩	névɻ
MSC-2--	ɪᵊz	ɪˡn	évrɪ	θɪŋ	hi	dʌz	dʌ́zn̩	névɻ
LSC-2--	ɪz	ɪn	évrɪ	θɪŋ	hi	dʌz	dʌ́zn̩t	névɻ

kʌm	bikʌ́z	ši	browk	hɻ	lɛg	wɪn	
kʌm	bɪkɔ́wz	ši	browk	hɻ	lɛˡg	hwɛn	
kʌm	bikɔ́wz	ši	browk	hɻ	leg	hwɪn	
kʌm	bɪkʌ́z	ši	browk	hɻ	lɛg	wɛn	

List LSC-4B

MSC-1--	naw	ɪz	yuzd	hɻ	yɛt	bʌt	šɪz	dʌ́zn̩t
LSC-1--	næw	ɪᵊz	yɪwz	hɻ	yɛt	bʌt	šɪz	dʌ́zn̩
MSC-2--	naw	ɪz	yuwzd	hɻ	yɛt	bʌt	šiz	dʌ́zənt
LSC-2--	naw	ɪᵊz	yúwzd	hɻ	yɛt	bʌt	šiz	dʌ́zn̩

nɛvɻ	hæv	énitaym	fɔr	ðɪs	béybi	ay	
névə	hæᵊ́v	ɪnɪtáə-m	fa	ðɪs	béybɪ	æ	
névɻ	hæv	ɛnitáym	for	ðɪs	béybi	ay	
nêvɻ	hæv	ɪnɪtáəm	fʌ	ðɪs	béybi	a	

APPENDIX II - FREQUENCY OF RECALL OF INDIVIDUAL WORDS FOR MSC AND LSC GROUPS

							TOTAL
1.	MSC-1A	V* 2-13 Say	N 18-6 child	P 6-6 down	Adj 5-11 their	P 2-0 near	
		AV 7-3 are	Pn 9-8 I	N 5-3 corner	Pn 7-22 we	N 8-4 pool	
		A 7-9 a	Adj 2-6 our	P 11-7 of	V 21-38 coming	Adj 17-11 my	155-109
2.	MSC-1B	P 3-1 of	Adj 4-7 little	N 10-16 mouse	P 4-6 to	AV 1-3 will	
		N 8-7 cat	N 6-5 airplanes	N 0-0 end	C 5-4 when	AV 4-8 is	
		Adv 10-5 very	Adj 16-17 pretty	Pn 24-12 I	Pn 28-11 he	Adj 32-13 green	155-115
3.	MSC-2A	A 18-27 The	N 25-32 bird	V 17-23 flew	N 21-14 south	P 9-11 in	
		A 22-20 the	N 16-16 chair	AV 7-3 is	Adj 18-17 black	N 13-10 gown	
		AV 15-16 was	V 17-10 surprised	P 12-9 by	A 18-14 a	N 30-17 store	258-239
4.	MSC-2B	A 17-22 The	N 23-26 girls	V 12-7 joined	Pn 6-0 others	P 12-8 in	
		A 17-18 the	N 22-23 school	AV 1-4 is	Adj 14-18 pretty	N 11-13 face	
		AV 4-15 was	Adj 18-7 afraid	P 12-11 of	N 21-8 velvet	C 31-20 and	214-204

APPENDIX II (cont.)

							TOTAL
		Adj	N	Adj	N	P	
		6-11	6-4	8-15	24-19	12-8	
5.	MSC-4A	Last	evening	that	lamp	in	
		A	N	V	P	A	
		14-19	26-13	10-10	8-11	17-26	
		the	livingroom	stands	near	the	
		N	C	Pn	V	Adj	
		24-26	21-30	27-30	35-23	11-29	
		door	when	I	came	that	267-256
		A	N	P	P	AV	
		11-15	15-14	2-1	12-1	2-3	
6.	MSC-4B	The	bushes	until	fall	are	
		V	Adv	C	Pn	AV	
		4-2	2-1	5-8	20-25	17-24	
		cancelled	immediately	because	he	was	
		P	Pn	C	A	N	
		32-27	30-26	15-10	31-32	43-37	
		with	her	when	the	telephone	241-226
		Pn	N	AV	Pn	N	
		5-4	23-33	2-1	9-6	3-1	
7.	LSC-1A	Me	baby	am	I	way	
		A	N	Pn	N	P	
		11-20	23-13	3-3	6-2	11-18	
		the	basement	them	morning	to	
		V	Adj	AV	Pn	Pn	
		15-8	8-3	22-12	27-18	18-15	
		come	our	was	me	I	186-157
		AV	V	V	N	V	
		11-5	10-4	2-7	0-0	3-1	
8.	LSC-1B	Are	going	go	alumnae	live	
		V	AV	P	Pn	Adj	
		6-14	7-14	1-7	3-10	4-1	
		cooking	would	down	I	much	
		Pn	Adv	AV	N	N	
		3-1	11-6	14-9	31-24	31-23	
		others	very	is	house	parents	137-126

APPENDIX II (cont.)

							TOTAL
9.	LSC-2A	C 6-7 and	Pn 3-11 I	AV 2-6 am	V 7-11 going	Adj 2-6 my	
		N 2-5 arm	AV 19-11 are	Pn 23-21 you	AV 21-16 are	Pn 23-24 you	
		AV 9-14 would	Pn 24-16 you	AV 31-19 can't	V 35-36 go	P 39-32 to	246-235
10.	LSC-2B	P 12-10 In	A 13-18 the	N 6-6 home	N 4-7 tomorrow	Pn 0-6 it	
		AV 4-4 is	Adj 4-4 this	AV 5-4 is	Pn 25-21 you	AV 27-19 are	
		Pn 34-32 you	AV 32-25 are	Adj 29-22 not	V 33-21 go	P 40-32 to	268-231
11.	LSC-4A	AV 12-2 Is	P 10-5 in	Adj 1-2 every	N 0-1 thing	Pn 7-12 he	
		AV 0-0 does	AV 1-5 doesn't	Adv 3-10 never	V 3-19 come	C 20-16 because	
		Pn 35-44 she	V 47-41 broke	Adj 43-41 her	N 41-42 leg	C 31-16 when	254-256
12.	LSC-4B	Adv 2-1 now	AV 2-3 is	V 1-0 used	Pn 4-5 her	Adv 0-1 yet	
		C 4-4 but	Pn 0-0 she's	AV 9-16 doesn't	Adv 4-10 never	AV 13-25 have	
		N 16-21 anytime	P 17-29 for	Adj 27-33 this	N 44-37 baby	Pn 25-15 I	167-201

* N=Noun, Pn=Pronoun, V=Verb, AV=Auxiliary Verb, Adj=Adjective, A=Article, Adv=Adverb, P=Preposition, C=Conjunction

† The first number in each pair indicates the number of times this word was recalled by an MSC subject; the second number indicates the same for the LSC group. Since each list was presented twice to each of the 24 subjects in both groups, the highest possible count for each word is 48.

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