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ABSTRACT

An exploratory study to discover the relationships between preferred learning modalities and differentiated presentations of reading tasks was conducted in a low socioeconomic, predominantly Puerto Rican public school in New York City, with 106 first-grade children as subjects. Preferred learning modality (auditory, visual, or kinesthetic) was identified by administration of The New York University Modality Test. The subjects were then randomly assigned within each modality to one of four experimental treatment groups or a control group. All subjects received the regular program of first-grade instruction. However, the treatments differed in the type of emphasis and materials used in the presentation of the reading tasks according to the learning modality emphasized. Criterion measures used were a word recognition test developed for this study and the Metropolitan Reading Achievement Test, Primary I. Among the results obtained from the word recognition test was that each of the four treatment groups differed significantly from the control group but not significantly from each other. According to the Metropolitan Test, the treatment groups did not differ significantly either from each other or from the control group on total reading score or on the word discrimination subtest. A bibliography, tables, and tests are included. (Author/NH)

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TABLE OF CONTENTS

LIST OF TABLES

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Bernice E. Cullinan, Leonore Ringler, Inez L. Smith

SUMMARY

This was an exploratory study to discover the relationship between preferred learning modalities and differentiated presentations of reading tasks. The study was conducted in a public school located in a low socioeconomic, predominantly Puerto Rican area in New York City. One hundred and six first grade children constituted the sample.

Preferred learning modality; auditory, visual, or kinesthetic, was identified by administration of The New York University Modality Test. The subjects were then randomly assigned within each modality by blocks to one of four experimental treatment groups and a control group. The major difference in the experimental treatment was in the type of emphasis and materials used in the presentation of the reading tasks. Each of the differentiated presentations, i.e., auditory, visual, kinesthetic, and combination, included oral discussion to develop the concept of the word, direct instruction with emphasis upon one of the four experimental methods, and reading of sentences and paragraphs. The reading vocabulary used in the presentations were fifty nouns and verbs. These words were selected through an analysis of the oral language obtained from taped discussions with a selected group from the study sample. Each subject in the experimental groups received approximately seven and one-half hours of small group instruction divided into thirty teaching sessions of fifteen minutes each. All subjects, both experimental and control, received the regular program of first grade instruction.

Criterion measures used were a word recognition test developed for this study and the Metropolitan Reading Achievement Test, Primary I. Analyses of variance and covariance were the primary means of analyses. The data yielded the following results:

1. On the word recognition test
   a. each of the four treatment groups differed significantly from the control group but not significantly from each other.
   b. there were no significant differences among the groups when the subjects were categorized by modality preference.
   c. there was no significant difference between the like treatment-modality preference group and the unlike treatment-modality preference group.

2. On the Metropolitan reading test
   a. treatment groups did not differ significantly either from each other or from the control groups on total reading score or on the word discrimination subtest.
   b. the like treatment-modality preference group did not perform significantly better than did the unlike treatment-modality preference or control groups.

It is possible that the results were affected by one or more of the

following: the small number of subjects on which the analyses were made, the large within groups variation, high attrition and absentee rates, use of a standardized reading achievement test with inner-city children that was normed on a national sample, insufficient amount of experimental treatment time, and the lack of a coordinated program between the experimental treatments and the regular classroom reading instruction program.

Although the findings of this study are not conclusive, they are in accord with reported results of modality studies using a similar sample.

INTRODUCTION

Background for the Study

The modality concept has gained increasing support and has engendered numerous research studies in recent years. Investigation of the learning process, particularly the process of learning to read, has established the idea that children learn to read through auditory, visual, and kinesthetic modes. Clinical evidence indicates that children with learning problems have greater facility in using one modality than another. Furthermore, children without specific learning problems have shown differences in the sensory modality preferred in their intake and processing of information. Children entering first grade appear to have developed strengths in one or more of the learning modalities, but attempts to assess their modality preference and to adapt instruction to that preference have been meager. Reading clinicians, however, have identified modality patterns of children with reading difficulties and have based remediation upon their findings. Still, there is not sufficient evidence to say whether teaching methods should emphasize the strongest or the weakest sensory modality of the learner. This study, then, was an attempt to discover the feasibility of identifying modality preferences of children entering the first grade and to determine the instructional approach that is most efficient for each modality preference.

Problem

This study was considered exploratory in that the principal investigators were most concerned with the discovery of a relationship between preferred learning modalities and differentiated presentations of reading tasks. The problem, therefore, was: What is the relationship between preferred learning modalities and differentiated presentation of reading tasks with beginning readers? It was an initial attempt to compare the effectiveness of differentiated instruction in relation to a beginning reader's preferred learning modality.

Definition of Terms

Sensory learning modalities refer to the sensory avenue (auditory, visual, or kinesthetic) through which the child takes in and processes information. A child's modality learning preference is the avenue in which he performs significantly better than the other modalities, as determined by the New York University Modality Test. (Smith, Ringler and Cullinan, 1968)

Differentiated presentations refer to four modes of instruction; namely, auditory, visual, kinesthetic, and a combination approach. The auditory instructional approach emphasizes use of the auditory sense, the visual approach emphasizes use of the visual sense, the kinesthetic emphasizes the kinesthetic and tactile senses, and the combination approach incorporates procedures from each of the other approaches.

Reading tasks were activities used to develop recognition of fifty words selected from the speaking vocabulary of children in the study sample.

Limitations of the Study

1. This study was limited to one public school in a lower socioeconomic area of New York City.

2. This study was limited to pupils entering the first grade in the aforementioned public school.

3. Only beginning first grade children with a speaking knowledge of English were included in the sample.

4. The instructional period was limited to thirty teaching sessions of fifteen minutes each.

5. The vocabulary to be taught was limited to fifty nouns and verbs taken from the oral language of children in the sample.

Significance of the Study

Proponents of particular approaches to beginning reading frequently hold that their approach is the one correct way to teach reading. Seldom will they admit that a method may work with one child and not another. Good practice and careful research are contributing to the knowledge that each child may require a unique method of presentation adapted to his learning modality. A growing body of evidence has shown that use of the preferred modality is crucial for remedial instruction but the question remains unanswered for a developmental reading program. The inconclusive and contradictory research findings about the role of modality preference and method of instruction need continued examination. This study, then, is an exploratory attempt to see if learning preference is related to the method of instruction used.

Recognized leaders in the field of reading instruction, such as de Hirsch, (1966), propose that knowledge of a child's preferred mode of learning is basic to any instructional program. Dechant (1966) states:

> In addition to an understanding of the pupil's maturational, experiential, intellectual, neural, physical, social, emotional, motivational, language, and sensory characteristics, knowing the pupil means knowing his preferred mode of learning. Identification of the child's mode of learning may well be the end goal of classroom diagnosis.... It would seem reasonable to utilize instructional materials which are congruent with each learner's particular strengths in perception, imagery, and recall.

Educators who have worked with culturally disadvantaged children have

noted that they learn in ways distinct from middle and upper class children. They have hypothesized that these children; particularly lower socioeconomic boys; are more kinesthetically than visually or auditorily oriented. Since this study is set in a lower socioeconomic area and identification of modality preference is an integral part of the study, information for verification of this hypothesis will be available. Further, Morency (1968) quotes Wepman as saying that it would be a continuing erroneous practice to approach all children as though they can learn equally well through the same modality. She points out that auditory discrimination and memory are but one set of factors that may contribute to the success or failure of children in beginning reading instruction and cites the need for longitudinal studies of normal populations and experimental populations. While the present study is not longitudinal, it does treat a normal public school population in a lower socioeconomic area.

Related Literature

Some questions which confront the researcher investigating the relationship of modality preference and differentiated methods of instruction are these: What is the relationship between sense modalities and reading ability? Which of the sense modalities is most crucial for the development of reading and other abilities? Should the method of instruction be geared to the individual's modality pattern? These questions form the basic framework for the review of related literature in this study.

Relationship between sense modalities and reading ability

Use of the sensory modalities to develop reading ability or to process any information is seldom disputed, but there is little unanimity on the degree of the relationship or the level of dependence of reading ability upon particular sensory development. Several investigators have examined the relationship of various sensory abilities to first grade reading achievement. Goins (1958) administered fourteen perceptual measures to two first grade populations and identified a general factor of visual perception which was related to first grade reading achievement. Barrett (1965) identified three readiness factors among nine frequently tested that were dependable for predicting first grade reading achievement. One of these factors, pattern copying, supports Goins' findings and stresses the kinesthetic modality. Birch (1964), Frostig (1961), Fernald (1943), Gibson (1962), Rosen (1966, 1968), Vernon (1958), Delacato (1963), Wepman (1961), Morency (1968), and others have found various sensory modalities to be significantly related to the development of reading ability in the first grade as well as in later years.

Other researchers have examined the relationship between reading ability and the reader's ability to shift responses from one sensory modality to another, his ability to make comparisons across sensory modalities, and his developmental pattern of perceptual abilities. Raab, Deutsch, and Freedman (1960) examined the relationship between reading achievement and ability to shift responses from one sensory modality to another. Using fourteen good readers and ten poor readers from the fourth and fifth grades,

they found that the poor readers had significantly greater difficulty making cross-modal shifts than did the good readers. Later, Katz and Deutsch (1963) studied the level of difficulty that retarded and potentially retarded readers displayed in rapidly shifting attention between auditory and visual stimuli. They found that the interaction between type of reaction time (within one mode or across modes) and reading achievement was significant.

Integration of auditory-visual skills as it relates to reading ability has come under investigation recently. Birch and Belmont (1965) gave 171 children from kindergarten through grade six auditory-visual tasks in which the child was to select a visual presentation of dots that looked like taps he heard in a specific rhythm pattern. Scores from the auditory-visual tasks and reading readiness or reading achievement tests were correlated at .70 and .42 at grades one and two respectively, but correlations at higher grades were not significant.

Muehl and Kremenak (1966) tested six-year-old children on four perceptual tasks requiring matching of patterns both visually and auditorily, as well as across these modalities. Knowledge of a child's score on the two perceptual tests involving cross-modality matching enabled accurate prediction of reading achievement, provided the reading scores were not close to the mean.

Sterritt, Martin, and Rudnick (1969) had confusing results from their study of sequence perception patterns as they examined children's ability to make comparisons across sensory modalities. They were expecting to find a child's pattern of relative perceptual strengths and weaknesses but found no clear cut picture. They did discover that the difficulty level of the sequence-perception tests was determined primarily by the stimulus modality of the pattern which was presented first and that visual-spatial patterns were much easier than auditory-temporal or visual-temporal patterns. The difficulty of developing adequate measures of sensory modalities was illustrated in this study and in an investigation by Carver (1969). Carver used a listening test developed by Orr and Graham (1968) to measure the listening comprehension of disadvantaged junior high school students. He judged the test to be a reliable and valid measure of listening comprehension for the group for which it was intended but not for other groups.

In an attempt to fill the void of longitudinal research on normal populations, Morency (1968) studied 179 children for a three year period. She found that perceptual abilities develop significantly in the first three years of school in a normal population and these abilities progress individually along lines of modality preference at differing rates in the same individual. She found that the relationship between first-grade perceptual ability and third-grade achievement was significant and she emphasized that the stage and adequacy of development in the various modalities is of crucial importance to successful achievement in the early grades. She further proposed that ability grouping on the basis of modality preference be done to provide maximum potential education for individuals.

Whereas the relationship between sense modalities and reading ability has been demonstrated, the degree and nature of that relationship remains unclear. Difficulties plaguing researchers in this area are many and adequate instrumentation is as yet unavailable. The present study was subjected to many of the same problems faced in the other research studies reported here.

Attempts to identify the most crucial sense modalities

Researchers have thought the development of the sensory modalities to be uneven in the individual. Their attempts to identify the preferred learning modality has produced varying results. Bakker (1966) used normal readers and ones he termed "backward" readers to study the relationship between sense modality learning preference and reading achievement. He examined the visual modality in relation to the kinesthetic modality and computed a difference-threshold quotient. The visual minus kinesthetic threshold was larger in "backward" readers than it was in normal readers. The differences were due to lower visual sensitivity rather than a greater kinesthetic sensitivity. Bakker concluded that the existence of a smaller visual dominance in backward readers may be responsible for kinesthetic interference in the visual process in reading.

Budoff and Quinlan (1964) concluded from their study of fifty-six second graders who learned paired associate words that the auditory mode was significantly more rapid for learning meaningful material than the visual mode. However, Hill and Hecker (1966) found that when the visual presentation was in the form of pictorial representations rather than letters, neither modality was found to be significantly better with their sample of thirty-two second graders.

Many (1965) also presented materials both visually and orally to sixth graders. He used oral and written versions of a comprehension test using a counter-balanced design with a two week interval between tests. There was a significant difference between the modes favoring the visual. A replication of this study with primary grade children would be very useful.

Lockhard and Sidowski (1961) found that with fourth graders the visual mode alone or in combination with other modes tended to be more effective than the auditory mode when the dependent variable was the learning of nonsense syllables. There was, however, no significant difference between the two modalities with sixth grade subjects.

King and Mueh1 (1965) compared the effectiveness of using five different sensory cues or combinations of cues; picture, auditory, picture and auditory, auditory plus echoic response, and picture plus auditory and echoic response. Two hundred and ten kindergarten children were trained to read a common list of either four similar or dissimilar four-letter words. The findings revealed statistically significant differences between the treatment cues only when similar words were used. Picture and echoic cues were significantly better than auditory cues. These findings contradict those of Budoff and Quinlan.

Dykstra (1966) administered seven auditory discrimination sub-tests from various reading readiness tests to 632 first grade children at the beginning of the year and a reading achievement test at the end of the year. Correlation coefficients between the measures ranged from .19 to .43. Using all of the measures in a regression equation, between 32 and 38 percent of the variance in reading achievement could be accounted for.

Barrett (1965) conducted a study similar to Dykstra's in an attempt to assess the value of several visual discrimination tasks from reading readiness tests. He concluded that information on visual discrimination ability alone is not enough to predict reading achievement.

Few consistent findings are reported in the studies reviewed. This may be explained partially by the experimenters' use of different materials, subjects, testing procedures, or experimental conditions. Or it may be that Chall's (1967) accusation that too much of the research was undertaken to prove that one ill-defined method was better than another ill-defined method is correct.

Adapting method of instruction to modality pattern

Many exhortations in the literature on reading instruction and modality patterns advise adapting the method of instruction to the modality pattern. The research in this area; however, has not as yet produced convincing and conclusive evidence to support this recommendation. The following studies illustrate the contradictory nature of the research findings to date.

Cooper and Gaeth (1967), using fourth, fifth, sixth, tenth, and twelfth grade students, employed a three-factor experimental design to investigate the relations among grade level, auditory and visual presentation, and level of meaningfulness. Two six-item paired associate lists, CVC nonsense syllables (trigrams) and three-letter nouns, with the same single letter responses were presented visually (slide projector) or orally (tape). Visual presentation of CVC was superior to the oral presentation at all grade levels whereas noun associations were learned more readily in grades four, five, and six when visually presented and in grades ten and twelve when orally presented. A downward extension of this research to include grades one, two, and three would have yielded much valuable information.

Buchner (1964) and Ford (1967) included a tactual-visual modality test in their work with fourth graders. The testing equipment used, however, would be difficult to employ in a field study. Otto (1961, 1963) similarly included a kinesthetic component. In both studies, he used paired associates (geometric forms and CVC trigrams) and presented them with either auditory, visual-auditory or kinesthetic-visual-auditory reinforcement. The findings from his two studies are contradictory. In his 1961 study he found that kinesthetic-visual-auditory was more effective for second graders, visual-auditory more effective for fourth graders, with no differences among sixth graders; whereas in his 1963 study there were no significant differences between modes of reinforcement at any grade level.

Mills (1956) compared four methods of teaching word recognition to second and third graders who were considered retarded readers. Using a kinesthetic, phonic, visual, and a combination of these three approaches, he found differences in effectiveness of methods at various intelligence levels. Generally children with an I. Q. below 80 did best with the kinesthetic approach, those with an I.Q. between 85 and 100 did best with the visual and combination approaches, and for those with an I.Q. above 105 all approaches seemed equally effective. The primary distinction between Mills' study and the one reported here is that he assigned instructional approaches without identifying the individual child's learning preference and used retarded readers from the second and third grades instead of normal beginning readers.

In a recent doctoral study, Bursuk (1968) investigated the relative effectiveness of combined aural-visual and predominantly visual teaching approaches in terms of the interaction with the various sensory modality learning preferences of adolescent retarded readers. She found a significant interaction between pupils' sensory modality learning preferences and the relative effectiveness of the sensory teaching approach used. Specifically, the combined aural-visual approach was more effective in improving the reading comprehension of auditory learners and pupils with no sensory modality learning preference than it was in improving the reading comprehension of visual learners. Also, the predominantly visual approach was more effective in improving the reading comprehension of visual learners than it was in improving the reading comprehension of auditory learners and pupils with no sensory modality learning preference.

In a comparable study, Bateman (1968) placed first grade children into groups based upon their modality preference and devised instruction to match the modality. She found that the auditory method of reading instruction was superior to the visual method for both reading and spelling; the auditory modality-preferred subjects were superior in both reading and spelling to the visual-modality - preferred subjects; but there was no interaction between the subjects' preferred modality and the method of instruction used.

The unequivocal results reported by Bursuk were not supported by Robinson (1969), Harris (1965), Bateman (1968), or the findings of the research reported here. Perhaps identification of modality preference is more crucial when working with retarded readers than with normal readers. In addition, Bursuk's sample consisted of adolescent subjects whereas the other studies used primary school children. Robinson (1969) attempted to determine the relative reading progress made by pupils with differing visual and auditory aptitudes when they were taught by a predominantly visual and a predominantly auditory approach to beginning reading. She found that both teaching approaches were equally effective with pupils having high visual-high auditory and low visual-low auditory perceptual abilities. Neither method consistently proved to be more effective than the other in compensating for inadequacies in specific modalities. Robinson warns of the tentativeness of these findings due to the small number of pupils who could be placed in the high visual-low auditory and low visual-high auditory subgroups. She further questions the tests used to identify

modalities and progress in reading achievement.

In summary, the research findings in the area of sensory modalities and reading ability have been contradictory and inconclusive. Inadequate measuring instruments, lack of definitive instructional approaches, limited instructional time and materials and variations in type of subjects studied are some of the factors that account for the conflicting reports.

METHODOLOGY

Setting

The study was carried out in an elementary school in the Lower East Side of New York City. The area includes factories, small businesses, tenement housing, and city-owned housing developments. The average family income is $3,000 or less, an amount which is considered subsistance level according to the federal government. A large number of the children who participated in the study receive Aid to Dependent Children which is local, state, and federally funded welfare monies.

The area is considered to be in transition since the ethnic composition of the population has been changing rapidly over the past fifty years. The area was formerly predominantly inhabited by people of the Jewish faith. As the majority of the Jewish people left the area for improved housing and a higher standard of living, black and Puerto Rican people moved into the neighborhood. Currently there is a large influx of Chinese and Slavic people. At present the racial composition of the school community is approximately 80% Puerto Rican, 10% Black, 5% Chinese, and 5% Caucasian. There is great mobility among the Puerto Rican children in the school district as they move back and forth between New York City and Puerto Rico.

Subjects

All first grade children were considered as subjects for this study. Although a total of 180 children were registered for first grade in September, 1969, the number of children who participated in the research was considerably less due to the following factors:

1. The New York City school strike which lasted until late November led many parents to transfer their children to nearby parochial schools. Approximately 20 children never appeared on classroom registers.

2. The research team decided that children who were rated below C on the Non-English Speaking scale used in the New York City public schools should not participate in the study. Since the study involved reading, it was felt that all the children needed a minimum oral language vocabulary. This criteria eliminated 32 first graders.

3. The research population was further decreased by the high rate of pupil mobility and absenteeism. Twenty-two children who were present at the start of the study did not complete all parts of the testing.

A total of 128 children were available for the initial testing. Of these

128 children, 106 completed the experimental treatment and all testing.

Vocabulary for Reading Tasks

In order to establish a reading vocabulary which would be relevant to the children, samples of their oral language were analyzed. Approximately 30 pupils were randomly selected to participate in small group discussions. Each group of 3-4 pupils met with a member of the research team for informal discussions. The discussions were motivated and guided by pictures and specific questions involving urban life. The discussions were taped and typescripts were analyzed by a frequency distribution of nouns and verbs used by the children. The frequency tabulation was compared to the vocabulary list of words in the Pre-Primer and Primer of the Bank Street Readers (1965) the basal text used in the cooperating school. All words that appeared in the Bank Street Readers noted above were deleted from the list. This procedure insured a vocabulary list based on the spoken language of the children and included only those words that had not yet been formally taught in the classroom. Fifty nouns and verbs with the highest frequency obtained during the informal discussions, excluding those that appeared in the basal reader, formed the word list for the experimental treatment (see Appendix B for word list).

Instruments

New York University Modality Test

The New York University Modality Test was administered to 128 children. The purpose of the test is to identify the preferred learning modality of a pupil from among auditory, visual, and kinesthetic modalities. The test was developed and pilot tested during the summer of 1968 under a research grant from the New York University Office of Educational Services to the principal investigators.

The criteria used for the development of the test included: appropriateness for first grade children, concurrence with the operational definitions of modalities used in the present study, and efficiency and efficacy of administration in a school setting.

Since intra-child rather than inter-child variability was the concern of the researchers, it was decided to use as many common items as possible in the measurement of the three separate modalities. Fourteen such items were thus included in the initial test. These items were composed of two, three, and four letters that could be heard as sounds or words as well as could be seen and touched. This, then, was the second part of the auditory, visual, and kinesthetic subscales. For the first part of each scale the items were similar for the visual and kinesthetic scales and consisted of 24 symbolic shapes and individual letters. For the auditory subscale, tapping items were used. Each of six different tapping patterns was paired with four choices making a total of 24 responses.

The content of each item of the test was chosen with a particular beginning reading skill in mind, e.g., configuration of letter shapes, beginning consonant and vowel sounds, reversals, left to right direction, etc. The original test, then, consisted of three parts as follows:

1. Visual subscale--38 items including 18 symbolic shapes, 6 individual letters, and 14 letter forms including two, three, and four letters.

2. Kinesthetic subscale--38 items in three-dimensional form identical to the visual items.

3. Auditory subscale--6 items using tapping patterns and 14 items using the identical letter forms (which now became sounds) of the visual and kinesthetic subscales.

The completed test was submitted to two specialists for review: Jeannette Jansky, coauthor of Predicting Reading Failure and presently with the Pediatric Language Disorder Clinic of New York; and Dr. Maria Horst, author of the Horst Reading Readiness Test and currently affiliated with the Pediatric Unit of the Queens General Hospital. It was also administered to twenty-two children for pilot purposes. It was found that the test was too long, especially the auditory subscale, and that four letter forms resulted in a span that was too wide for the children's hands on the kinesthetic subscale. From the pilot and from the comments of the reviewers the test was revised and shortened. The revised form which was used in this study consists of:

1. Visual subscale--27 items including 12 symbolic shapes, 4 individual letters, and 11 letter froms including two and three letters.

2. Kinesthetic subscale--27 items in three-dimensional form identical to the visual items.

3. Auditory subscale--3 items using tapping patterns and 11 items using the letter forms (which now became sounds) of the visual and kinesthetic subscales.

A copy of the recording sheet used by the examiners will be found in Appendix C. From this it is possible to see the items used for each subscale. However, this is the recording sheet only and not the test format.

The visual subscale of the test was presented to the child by having each stimulus symbolic shape, letter, or combination of letters on a different page with four alternative choices from which the child could choose the same pattern by putting a mark on his choice. For the auditory subscale of the test the tapping patterns and letter sounds were recorded for standardized presentation, and the child listened to the tape and answered yes or no as to whether the response pattern was the same as the stimulus pat-

tern. For the kinesthetic subscale of the test the symbolic shapes were made of wood and/or ceramic tiles. The letters are 1½ to 2½-inches in size and are of ceramic composition. These are attached to individual 5½ by 7-inch cards backed with velcro for easy removal. All of the items were placed in a box behind a curtain instead of blindfolding the child, so that the items could not be seen. The child then pulled off the card that held the shape he thought corresponded to the stimulus shape.

The auditory and kinesthetic subscales were administered individually while the visual subscale was administered in small groups (three to four children). Three testing sessions were required for each child and the total testing time was approximately one and one-half hours.

Criterion Test

A criterion test was developed by the principal investigators and was used as a pretest and posttest measure of word recognition. The previously established vocabulary list of 50 words plus 150 words selected from the Bank Street Readers were used to construct 50 test items. Each test item included one word from the vocabulary list and three distractors. An attempt was made to select distractors whose configuration (size and shape) and/or initial sounds were similar to the test words. The order of presentation of the test words was randomly determined. In addition, the position of the correct response within each item was randomly assigned (See Appendix D for copy of Word Recognition Test).

The test was administered in each first grade classroom by members of the research team. Testing time was approximately 40 minutes. The pretest was administered prior to the start of the experimental treatment and the posttest immediately following the completion of the 30 teaching sessions.

Reliability was determined by the K-R formula applied to the posttest measure with 106 subjects. An r of .94 was obtained.

New York State Readiness Test

This test was administered in the first grade classrooms as part of the New York City Board of Education testing program. The New York State Readiness Tests are a special edition of Metropolitan Readiness Tests. This edition is identical to the regular edition in content and organization except for omission of the Draw-A-Man Test. The New York State edition also includes a "Readiness Inventory" that is not a part of the regular edition. Validity and reliability data are available in the Manual of Directions (New York State Readiness Tests, 1965).

Metropolitan Reading Test

The Metropolitan Reading Test-Primary I was used as the measure of reading achievement. The test was designed for use in the latter half of first grade and consists of the following four tests: Word Knowledge, Word Discrimination, Reading, and Arithmetic Concepts and Skills. For the purpose

of this study only the first three tests were administered. Validity and reliability data are available in the Manual of Directions (Metropolitan Achievement Test: Primary I, 1959).

Assignment of Pupils to Groups

Upon completion of the New York University Modality Test, means and standard deviations were obtained for each subscale, i.e. auditory, visual, and kinesthetic. These data are presented in Table 1.

TABLE 1

MEANS AND STANDARD DEVIATIONS FOR MODALITY TEST SUBSCALES

	Auditory	Visual	Kinesthetic
Mean	36.04	19.57	13.41
S.D.	7.35	4.85	4.45
No. Items	56	27	27

T scores were then computed for each subscale of the test. To determine each subject's preferred modality, intra-child T scores were examined. If any one of the three T scores exceeded the other two by a minimum of ½ S.D. this modality was assigned to the subject as his preferred modality. Out of 128 subjects 30 had an auditory preference; 33 visual preference; and 28 kinesthetic preference. The remaining subjects were classified as either having no preference (12) or a weak preference (25). In the latter case, one modality T score was a minimum of ½ S.D. below the other two which did not differ from each other.

TABLE 2

CHI SQUARE OF MODALITY PREFERENCE BY SEX

	MODALITY PREFERENCE					
	Auditory	Visual	Kinesthetic	No Preference	Weak Preference	Total
Girls	14	11	8	5	8	46
Boys	9	19	14	5	13	60
Total	23	30	22	10	21	106*

$X^2 = 4.27$ N.S.

* This analysis includes only the 106 subjects who were used for final analyses.

Within each modality group, T scores for each subject were rank ordered from high to low. The pupils were then randomly assigned within each modality by blocks to one of four experimental groups and a control group. The assignment of subjects to groups is shown in Table 3.

TABLE 3

NUMBER OF SUBJECTS ASSIGNED TO EACH GROUP BY MODALITY PREFERENCE

	Treatment Groups					
Modality Preference	Auditory	Visual	Kinesthetic	Combination	Control	Total
Auditory	6	6	6	6	6	30
Visual	7	7	6	7	6	33
Kinesthetic	6	5	5	6	6	28
No Preference	2	3	2	3	2	12
Weak Preference	4	5	6	5	5	25
Total	25	26	25	27	25	128

The initial research design did not include the no preference and weak preference groups. However, because of the loss of subjects as noted on page 9, it was decided that all available subjects should be included in the study.

Materials

Materials were developed by the principal investigators and the research assistants for each of the four methods of presentation.

As an initial step, the 50 vocabulary words were divided into six groups so that there was a unifying theme among the words in each group. For each group of words a set of black and white pictures was selected and a list of guiding questions was developed. The pictures and guiding questions were used by the research assistants to involve their groups in oral discussion in order to develop the concept of each word (see Appendix E for sample of word group, guiding questions and picture). These materials were presented to all experimental subjects.

In addition, specific materials were used for each of the differentiated presentations (i.e. auditory, visual, kinesthetic, and combination). These varied according to the experimental emphasis. The auditory presentation

group concentrated on listening to the sound of the whole word in isolation and in context in addition to specific initial or medial sounds. Both tape recordings and voice presentations were used. The visual presentation group concentrated on the configuration (size, shape, double letters, etc.) of the words and used overhead projector, visuals, and newsprint to outline the shape of the fifty words. The kinesthetic presentation group used word cards on which the fifty words were outlined in pipe cleaners for a three-dimensional effect and tactile emphasis. In addition, this group used clip boards, word cards printed in black on white for tracing, and crayons. The combination presentation group used large word cards to show configuration, tracing paper and crayons for tactile emphasis, and voice presentation of the words.

Reading materials using the fifty vocabulary words were of two types. For each of the fifty words four to six sentences were prepared in which the new word was repeated several times. At the end of each group of words a paragraph was developed which included all of the words taught in that word group. Both the sentences and the paragraphs were structured so that there was continuous review of previously taught words (see Appendix F for sample sentences and paragraphs). A total of 140 sentences and six paragraphs were constructed.

Experimental Treatment

Each research assistant was assigned to one of the four experimental groups. The assignment was based on an expressed interest in a specific method of presentation by each of the assistants. The total teaching group (e.g. kinesthetic presentation) was divided into five small groups (four to six subjects) for the teaching sessions (see Appendix G for sample of record sheet).

The major difference in the experimental treatment was in the type of emphasis and materials used in the direct teaching of the fifty vocabulary words. All experimental subjects were involved in oral discussion to develop the concept of the word, direct instruction with emphasis on one of the four experimental methods, and reading sentences and paragraphs (see Appendix H for Basic Lesson Plan and Differentiated Presentations).

The research assistants met with each of their small groups for fifteen minutes daily. This instruction was conducted from 9:00 A.M. - 11:30 A.M. Thirty teaching sessions were held. Each pupil in the experimental groups received a total of approximately seven and one-half hours of small group instruction using one of the four methods of presentation. The control groups did not receive any special small group work. All subjects, both experimental and control, received the regular program of first grade instruction including reading readiness activities and beginning reading using the Bank Street Readers.

ANALYSES AND FINDINGS

The intended analysis was to have been a factorial analysis of variance with methods of presentation and preferred modality as the independent variables and the word recognition posttest the dependent variable. Subject attrition, however, depleted the cells to the extent that there were only from three to seven subjects in each major modality preference by teaching method cell. Table 4 presents the distribution of subjects remaining in the sample at the end of the study.

TABLE 4

NUMBER OF SUBJECTS IN THE SAMPLE AT END OF STUDY

	Teaching Method					
Modality	Auditory	Visual	Kinesthetic	Combined	Control	N
Auditory	5	5	6	4	3	23
Visual	7	6	4	6	7	30
Kinesthetic	5	4	5	4	4	22
No Preference	2	2	1	3	2	10
Weak Preference	4	4	5	5	3	21
Total	23	21	21	22	19	106

Since the small N in each cell precluded the use of a factorial design, several one way analyses of covariance or variance were used.

The first analysis was a one way analysis of covariance with unequal N's using teaching method as the independent variable, the word recognition posttest as the dependent variable. Table 5 presents the means and standard deviations of the pre- and post-word recognition tests by treatment groups.

Before applying an analysis of covariance to the data, a test of homogeneity of within groups regression coefficients was made. Since the F ratio for this was non-significant at the .01 level, the covariance analysis was undertaken. Table 6 presents the covariance source table.

Since the F ratio was significant, the Newman-Keuls multiple comparisons test was used to determine where differences between pairs of ordered adjusted means existed.

TABLE 5

MEANS AND STANDARD DEVIATIONS OF THE
PRE- AND POST-WORD RECOGNITION TESTS BY TREATMENT GROUPS

		Auditory	Visual	Kinesthetic	Combined	Control
Pretest	$\bar{X}$	18.30	19.33	21.05	18.32	19.32
	SD	9.19	11.41	10.22	10.21	10.28
Posttest	$\bar{X}$	35.26	34.62	37.48	29.50	24.63
	SD	12.17	11.87	14.09	13.54	13.54

TABLE 6

SOURCE TABLE FOR THE ANALYSIS OF COVARIANCE
BY TREATMENT AND CONTROL GROUPS

Source of variation	d.f.	Adjusted Sums of squares	Mean Square	F
Between Groups	4	1957.5661	489.3915	5.2741*
Error	100	9279.1692	92.79	
Total	104	11,236.7353		

*significant $P < .01$

TABLE 7

NEWMAN-KEULS TEST ON ALL ORDERED PAIRS OF ADJUSTED MEANS

Ordered adjusted means	24.56	30.32	34.53	36.09	36.59
Treatment	control	combined	visual	auditory	kinesthetic

		Differences Between Means			
	Control	C	V	A	K
Control	---	5.76	9.97*	11.53*	12.03*
C		---	4.21	5.77	6.27
V			---	1.56	2.06
A				---	.50
K					---

*Significant at .05. Since the original analysis had an a priori significance level set at .05. it was felt that the alpha level for the Newman-Keuls test should also be set at .05.

Since the multiple comparisons test was being applied to the analysis of covariance data with unequal cell frequencies, two adjustments were made in the formula. First, a mean square error effective was computed for the error term and second, the harmonic mean was used. Table 7 presents the results of the Newman-Keuls test.

As can be seen from Table 7, there was a significant difference between each of the treatment groups when compared to the control group, but no significant differences among any of the treatment groups when compared with each other.

The second one way analysis of variance was used to determine if there were any significant differences on the posttest among modality preferences regardless of treatment groups. The pretest means, by modality group, ranged from 20.20 to 18.26 which meant that the largest difference between any two means was only 1.94. Since the F ratio for the analysis of variance of these pretest scores was <1, an analysis of variance was similarly used with the posttest scores. The means for the posttest were as follows: auditory group 32.56; visual group 32.90; kinesthetic group 31.27; weak preference 31.43, and no preference group 33.00. It can be seen that the largest difference between any two means was only 1.83 and thus it is not surprising that the F ratio for the analysis of variance was not significant. Table 8 present the source table for this analysis.

Table 8

SOURCE TABLE FOR POSTTEST SCORES
FOR MODALITY PREFERENCE

Source of Variation	d.f.	Sums of squares	Mean square	F
Between Modality Preference	4	184.6318	46.1579	<1
Error	101	20079.8588	198.8104	
Total	105	20264.4906		

Since the principal investigators were particularly interested in interaction and were not able to use a factorial design, a third one way analysis of variance was computed between like treatment and preferred modality groups. For this analysis only the subjects who were classified as having an auditory, visual, or kinesthetic modality preference and who were in the auditory, visual, or kinesthetic treatment groups were used. There were only 16 subjects who fit the like group designation; five auditory-auditory, six visual-visual, and five kinesthetic-kinesthetic. Their pretest mean was 18.25 with a standard deviation of 8.93 and their posttest mean was 32.31 with a standard deviation of 12.92. Thirty-one subjects fit the unlike group designation and their pretest mean was 20.19 with a standard deviation of 10.85. Their posttest mean was 37.71 with a standard deviation

of 12.79. Since an analysis of variance of the pretest scores yielded an F ratio of 1, a similar analysis was performed on the posttest scores. The source table for this analysis is presented below:

Table 9

SOURCE TABLE FOR POSTTEST SCORES FOR LIKE AND UNLIKE TREATMENT-MODALITY PREFERENCE GROUPS

Source of Variation	d.f.	Sums of squares	Mean square	F
Between Like-Unlike Groups	1	307.4095	307.4095	1.8674 (NS)
Error	45	7407.8246	164.6183	
Total	46	7715.2341		

Thus, the results yielded no significant difference between those pupils who were taught by the method that corresponded to their modality preference and those subjects who were taught by a method that did not correspond to their modality preference.

In summary, then, with reference to the analyses of covariance and variance of the word recognition posttest scores, the following results were obtained:

1. Each of the four treatment groups differed significantly from the control group but not significantly from each other.

2. There were no significant differences among the groups when the subjects were categorized by modality preference.

3. There was no significant difference between the like treatment-modality preference group and the unlike treatment-modality preference group.

It was initially intended to use reading readiness scores as a covariate in the posttest analysis. This was not done and, as previously noted, pretest scores were used instead. The reason for the omission of reading readiness scores was that scores were available for only 85 subjects. This would have meant that the sample would have been further depleted by 21 subjects and the investigators felt that it was more important to use all 106 available subjects. An analysis of variance, however, was computed between the four treatment groups and the control group using the 85 subjects who had reading readiness scores. The F ratio was 1.2179 which was not significant at the .05 level. It may be said, then, that the groups, at least with those subjects whose reading readiness scores were available, did not differ significantly from each other. Since there is no reason to infer that subjects whose reading readiness scores were not available did

not come from the same population as those whose scores were available, the above results may be generalized to the total sample group.

Metropolitan Reading Achievement Test, Primary I scores were available for 87 subjects. To determine if there were any significant differences among the groups an analysis of variance was computed first on total scores (word knowledge, word discrimination, and reading) and then on the word discrimination subtest scores. Tables 10 and 11 present the source tables for these analyses.

TABLE 10

SOURCE TABLE FOR METROPOLITAN READING ACHIEVEMENT TOTAL SCORES BY TREATMENT AND CONTROL GROUPS

Source of variation	d.f.	Sums of squares	Mean square	F
Between groups	4	953.9672	238.4918	1
Error	82	32,811.6420	400.1419	
Total	86	33,765.6091		

TABLE 11

SOURCE TABLE FOR METROPOLITAN READING ACHIEVEMENT WORD DISCRIMINATION SCORES BY GROUPS

Source of variation	d.f.	Sums of squares	Mean square	F
Between groups	4	156.2976	39.0744	1
Error	82	5,641.9323	68.8040	
Total	86	5,798.2299		

As can be seen from the results, both analyses yielded F ratios of less than one. It may be said, then, that there were no significant differences among the groups, that the treatment groups did not differ significantly either from each other or from the control group.

An analysis of variance using total scores was then computed for subjects who were classified as like treatment-modality preference, unlike treatment-modality preference, and control although the cell frequencies were unequal and in two cases were quite small, like treatment-modality preference (13) and control (11). Table 12 presents the source table for this analysis.

TABLE 12

SOURCE TABLE FOR METROPOLITAN READING ACHIEVEMENT SCORES FOR LIKE AND UNLIKE TREATMENT-MODALITY PREFERENCE AND CONTROL GROUPS

Source of variation	d.f.	Sums of squares	Mean square	F
Between groups	2	1,198.9384	599.4692	1.5972 (N.S.)
Error	48	18,014.9832	375.3121	
Total	50	19,213.9216		

From the table it can be seen that the F ratio was not significant. The like treatment-modality preference group did not perform significantly better on the Metropolitan than did the unlike or control groups. It appears, then, from the results presented in this section that there was no significant transfer from the learning of specific words by differentiated presentations, either like, unlike, or mixed to general reading achievement, as measured by total score on the Metropolitan Reading Achievement Test, Primary I, or to word discrimination, as measured by this subtest of the Metropolitan.

DISCUSSION

The findings revealed no significant differences among groups when they were considered as total treatment groups (differentiated types of word presentation) or as like treatment-modality preference and unlike treatment-modality preference groups on either the word recognition criterion test or the Metropolitan Reading Achievement, Primary I Test. It is possible that the results were affected by one or more of the following reasons.

First, the total number of subjects on which the analyses were made was only 106 when the total group data were analyzed and, thus, when specific cells were used the frequencies were relatively small. The effects, therefore, would have needed to be quite large to reach significance at the .05 level. An additional problem was the large within groups variation among pupils. Besides the student attrition rate as a result of the New York City teachers' strike, there was a high rate of absenteeism during the experimental treatment. Some children were absent as much as 50 percent of the time.

In order to identify modality preference, a half of a standard deviation was used to differentiate the children on the New York University Modality Test and thus to classify them by preferred modality. Since the standard deviations of the subscales were relatively small the groups may not have been that disparate on preferred modality which might have confounded the results.

Another contributing factor might be that the Metropolitan Reading Achievement Test is not oriented toward the vocabulary of the inner-city child. Since the vocabulary presented during the experimental treatment consisted only of words taken from the oral language of the children, themselves, it is possible that the Metropolitan, which was standardized on a national sample, was inappropriate for the sample used in the study.

It is possible, also, that seven and a half hours of specialized instruction using varying methods of presentation was an insufficient amount of time to alter a child's reading achievement. In addition, the daily classroom reading instruction was not coordinated with the experimental treatments which used a modality approach and emphasis. The conventional basal reading approach for beginning reading instruction was used by the classroom teachers. The effects of the experimental treatment were apparently not strong enough to be distinct from the effects of a full year's program of conventional basal reading instruction.

RECOMMENDATIONS

The investigators feel that the "theoretical rationales" that abound in relation to beginning reading instruction need to be explored further. Although the results of this study did not yield conclusive results, they were in accord with results reported by Bateman (1968), Harris (1965), and Robinson (1969). It is felt that the study afforded many valuable insights that need to be pursued. It was found that children do have preferred modalities and that these can be differentiated. A larger sample is needed, however, to yield larger cell frequencies for more precise analyses. The length of time used for the experimental treatment needs to be much longer. In fact, it is recommended that specific modality methods and approaches be used experimentally by classroom teachers for at least one full semester of regular first grade reading instruction. The investigators would like to add their recommendation to the many educators and researchers who have previously done so, that a valid reading achievement test by developed for inner-city children. Finally, the investigators feel that an intensive study of the beginning reading process is imperative so that children may be provided with reading instruction that uses their most efficient intake processes with the hope that maximum reading achievement will result. Only in this way can schools hope to reduce or eliminate the ever increasing problem of reading disabilities in the upper grades.

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Appendix A

Sample Typescript from Conversation with Children To Establish Relevant Vocabulary

He skating. That a snowman. I like to play hide and seek. I like to play with the snow. And they was takin' a bath in the pump. The police open it. He turn it, you turn this, with this thing. The police do.

And the policeman was there. No, I went in a swimming pool. I swim in a swimming pool and I go down in the water. And then I got a fish. I got a fish. Then my father bringed me again. All the time my father bringed me along there. He bring me in the boat. He caught much. I eat it.

They are playing house. Dolls. They are playing ball. They are playing giant step. They are playing ball in the wall. They bounce it on the wall, and the cat is looking at it. They run around the bases. It's baseball. They are jumping.. and they tag. The girls are jumping rope, not the boys. No, I like to jump rope. They play hide and go seek. One kid goes, one, two, three, and one girl is running. You have to hide, and somebody has to count and then somebody has to catch you. They can't find that guy. This one, he hiding in a truck. He goina hide behind the truck. He could go up there and hide. They are playing ball. An' there another cat. I had a cat I find it, and a lot of peoples come here, then we let the cat go and he came back, then he got hit by a car. We gave the cat a ball.... The man with the truck hit another man with a cat. I got hit with a car. And my brother got his fingers under the bus. His hand got under, his fingers got all smashed. And then my finger came off. (His fingers were all there.) Yep, the door locked on my finger.

Examiner's question: Do you know what they are playing?

Birds. Maybe bluebirds.. Yeah, Yeah. Me, too. I acted like a bird. Girls play jacks. I don't like to play jacks, only baseball, and hide and seek, and I like to play footsies. I gots a footsie at home. You know, you turn. You put it on your foot and you jump it. You put your foot like this and turn around and jump it. They no ball on there, it's a thing like a bell. I gots a bell one. You can put it on a string, and then you jump it.

They are taking a bath. The police goina lock it. He lock it. He's going a lock it. He open it. Yeah, to play. What's he doing like that? OOOOOH, rides.....(oil tanks in background of pictures that might look like the top of a roller coaster) Rides. It doesn't look like rides to me. They playing water. I bet he say that the policeman there. That boy... Oh, he say AAAAAAAAAH I went in the puddle yesterday. Ouch, it hurts. I went in the hot one.. Me, too. Thats the hot one. Real hot one. On my block it's a hot one, it's a real hot one.. In another block, every time somebody open up the pump, the police come all the way fast down my block and then they cut off the pump. And then the boys put it back on. The police open the pump and we play, me and my brother we

found the pump first and the police say we can keep it, Yeah and we keep it and he say "Don't let nobody come in, only you, and you mother and your father, and your sister." And we went in the snow. It's good to go in the snow!!!! When it was snowing, I made a biiiiig snowman. And, the snow in a big pile. Oh, look at dat. Look at dat. A skate, to ride on it. I think it's a sled.. What he doing? He could pinch hisself with that. He could get killed with these.(sharp points on the fence) People go on these slick. (banister with snow) He don't go fast. He don't like to go there. Only on this side he get a long road, like this. If it snow again, I'm going make a big snowman again. I'm goin a make a more bigger house. A big house like that one full of snow. Then I go in, and I put a box there and then I dig, and then I go to the roof and then I break the roof and break through the walls. Not me, you could get bumped.

Appendix B

Frequency Tabulation of Vocabulary

	Word	Frequency
*	is	49
*	go	35
	play	29
*	girl	21
*	boy	18
	got	18
	like	17
	get	17
*	are	16
	cat	15
	don't	15
	had	15
	hit	13
	know	13
	jump	12
	was	11
	police	10
*	house	10
*	come	10
	make	9
*	put	9
*	say	9
	have	9
*	car	9
	snow	9
*	fire	8
*	father	8
*	look	7
	ball	7
	hide	7
	brother	7
	rope	7
	water	7
	cut	7
*	school	6
	window	6
	went	6
	do	6
	throw	6
	baby	6
	park	6
	pump	6
	snowman	5
*	book	5
	want	5
	skate	5
*	see	5
	ride	5
	open	5
	lock	5
	try	5
	bicycle	5
	fish	5
*	mother	5
*	turn	5
	game	5
	buying	4
	break	4
	doesn't	4
	has	4
	keep	4
	let	4
*	run	4
*	truck	4
	time	4
	wall	4
	dog	4
	foot	4
*	fireman	4
	grandmother	4
	policeman	4

* Words deleted that appeared in Bank Street Readers

Appendix C

New York University Modality Test

Recording Sheet

DATE _____ CLASS _____

PUPIL _____ EXAMINER _____

To the examiner:

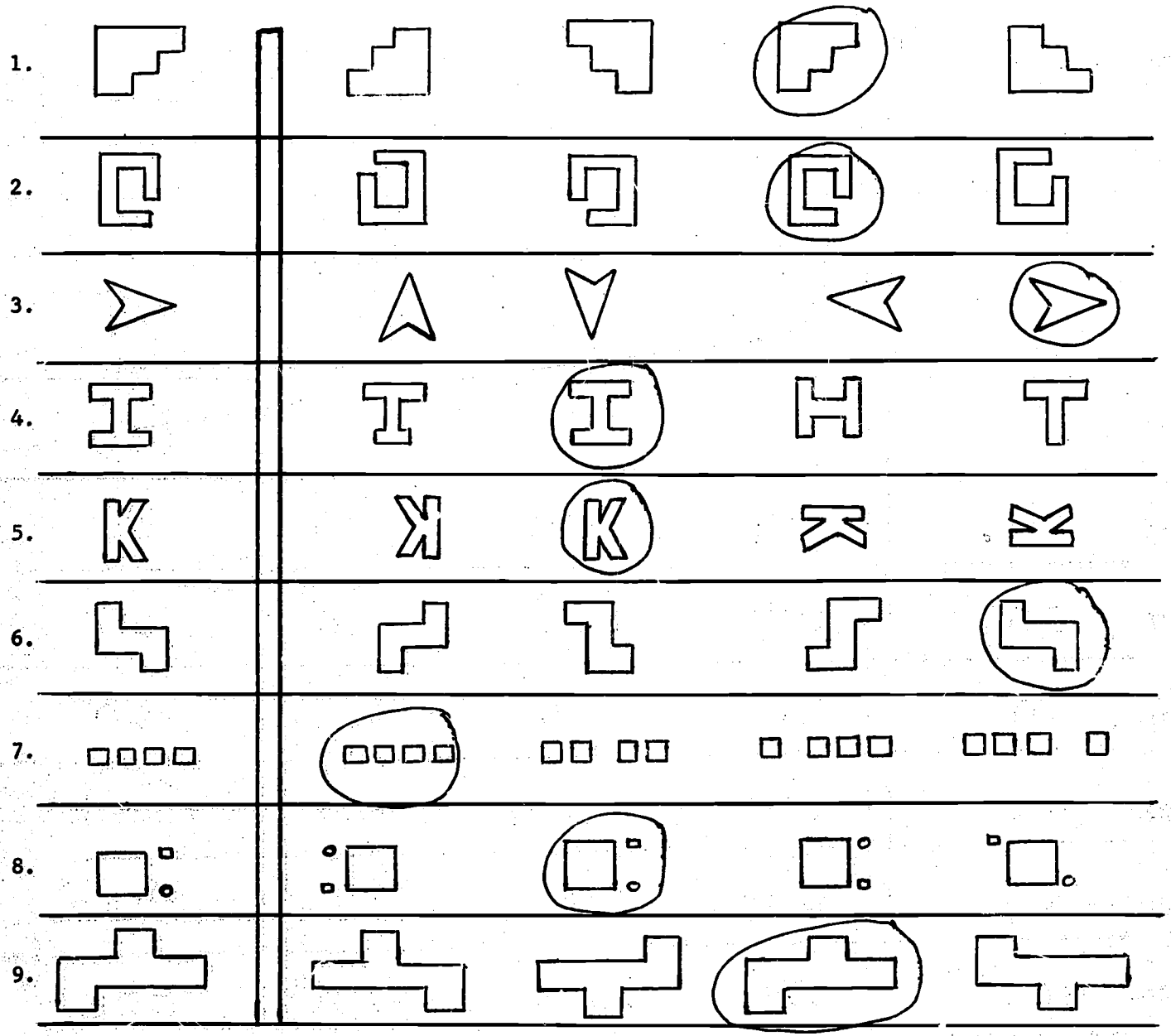
Visual Subscale: Record pupil responses from test booklet in Red

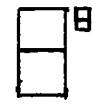
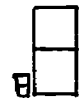
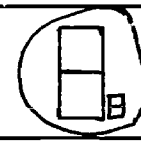
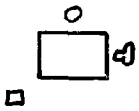
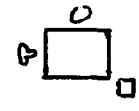
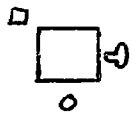
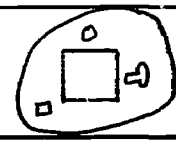
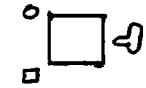
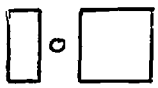
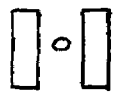
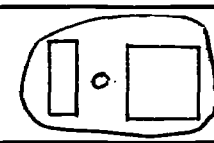
Kinesthetic Subscale: Record pupil responses during test administration in Blue

Auditory Subscale: Record pupil responses during test administration

NEW YORK UNIVERSITY MODALITY TEST

VISUAL/KINESTHETIC TESTS



10.					
11.					
12.					
13.	C	S	O	C	Q
14.	M	N	W	M	V
15.	d	p	a	b	d
16.	n	r	m	u	n
17.	ab	ba	ga	ab	da
18.	on	no	on	am	an
19.	un	nu	on	un	an
20.	me	ma	mo	mu	me
21.	bag	gab	dab	bag	bad
22.	ape	ate	aid	ape	abe
23.	tin	ten	tan	tin	tan

24.	pin	pan	pen	(pin)	pun
25.	tip	tin	tic	tib	(tip)
26.	blo	slo	flo	glo	(blo)
27.	for	fro	far	fir	(for)

AUDITORY TEST

1.	••••	•• ••	(••••)	••• •	• •••
2.	•• ••	••• •	••••	• •••	(•• ••)
3.	••• •	••••	(••• •)	• •••	• •••
4.	ab	ba	ga	(ab)	da
5.	on	no	(on)	am	an
6.	un	nu	on	(un)	an
7.	me	ma	mo	mu	(me)
8.	bag	gab	dab	(bag)	bad
9.	ape	ate	aid	(ape)	abe
10.	tin	ten	ton	(tin)	tan
11.	pin	pan	pen	(pin)	pun
12.	tip	tin	tic	tib	(tip)
13.	blo	slo	flo	glo	(blo)
14.	for	fro	far	fir	(for)

Appendix D

USOE Modality Study

WORD RECOGNITION TEST

Directions to examiner: Instruct children to circle the word that you pronounce. Do the sample items with the children. Make certain that each child understands that he is to circle only the word that you pronounce. Read each word slowly. Repeat each word once.

1. do
2. had
3. park
4. foot
5. open
6. bicycle
7. get
8. pump
9. police
10. break
11. dog
12. buying
13. grandmother
14. wall
15. game
16. rope
17. jump
18. cut
19. was
20. went
21. know
22. doesn't
23. lock
24. make
25. ball
26. snowman
27. don't
28. skate
29. throw
30. play
31. let
32. fish
33. have
34. water
35. got
36. has
37. like
38. snow
39. hide
40. try
41. cat
42. time
43. want
44. keep
45. baby
46. hit
47. policeman
48. window
49. brother
50. ride

WORD RECOGNITION TEST

NAME: _____

DATE: _____

CLASS: _____

SCORE: _____

SAMPLE ITEMS:

	boy	toy	bad	book
	car	can	call	cake
	good	go	got	going

I.	he	do	at	did
2.	hit	here	had	have
3.	pull	purr	park	break
4.	cool	foot	four	fish
5.	more	one	open	over
6.	bigger	bicycle	birds	lights
7.	got	out	cut	get
8.	pump	girl	jump	push
9.	police	people	open	plane
I0.	thanks	brother	truck	break
II.	boy	do	day	dog
I2.	bicycle	police	people	buying
I3.	mother	grandmother	brother	father

14.	ball	with	wall	walk
15.	plane	game	make	back
16.	look	read	room	rope
17.	jump	rope	round	going
18.	cut	put	cat	car
19.	way	was	are	has
20.	time	turn	tell	went
21.	new	know	who	night
22.	down	boxes	doesn't	itself
23.	park	look	live	lock
24.	work	make	truck	made
25.	ball	fell	will	all
26.	lunchroom	workman	snowman	fireman

27.	don't	stop	doesn't	goes
28.	street	skate	keep	steps
29.	snow	throw	slow	know
30.	play	away	many	baby
31.	say	try	let	fly
32.	fish	high	fire	five
33.	hide	here	ride	have
34.	water	want	away	wall
35.	dog	boy	put	got
36.	had	and	has	her
37.	back	like	lock	light
38.	snow	some	skate	school
39.	high	hide	like	milk

40.	day	sky	they	try
41.	cat	and	get	let
42.	turn	time	game	come
43.	down	went	don't	want
44.	boat	help	three	keep
45.	city	play	back	baby
46.	hit	him	hot	did
47.	police	fireman	policeman	snowman
48.	wanted	window	throw	water
49.	friend	mother	brother	father
50.	ride	read	run	race

Sample Word Group*

jump	park
rope	time
hide	bicycle
ride	skate

Materials Used in Teaching Sessions

Guiding Questions

1. Show picture of a girl jumping rope
   Did you ever jump rope?
   Is it fun?
   Are there other ways to use a rope besides jumping rope?
   Show picture of girl playing hopscotch
   What is this girl doing?
   What do you call this game?
   Ask 2 or 3 children to jump.

2. Did you ever play a game called hide and seek? How do you play it?
   Ask one child to hide behind a table or chair.
   Show picture of a boy up in a large tree.
   What do you think the boy might be doing in the tree? (hiding)
   Do you think his friends will find him?

3. Show picture of two boys in their wagons.
   Would you like to ride in a wagon?
   Do you think it might be fun to ride in a wagon?
   What other things might you ride in?
   Try to elicit the following pattern:
   I ride a bicycle
   I ride in a car.
   I ride on a bus.
   I ride on a train,
   etc.

4. What time do you wake up in the morning? have lunch?
   go to bed? watch T.V.?
   Show a picture of a clock.
   Have pupils look at the clock. Can anyone tell the time?
   Why do we use watches and clocks? (to tell us the time)

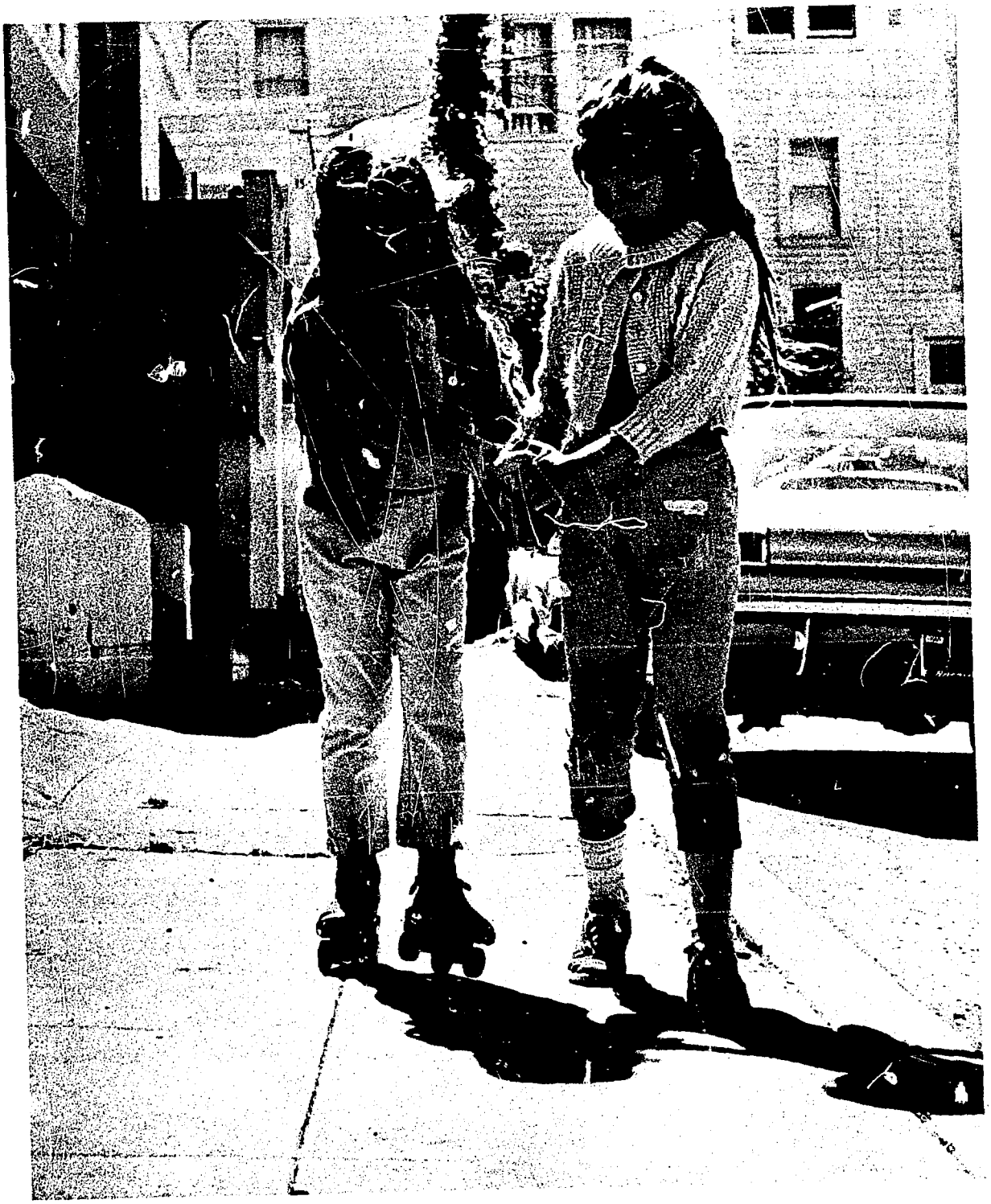
5. Some days when you have time to play you might go to the park to play.
   Show a picture of two boys playing ball in the park.
   What are the boys doing in the park?
   What other things do you like to do in the park?
   Is there a park near your house?

6. Show two pictures; one in which two boys are using bicycles; one in which a girl is skating and has just fallen.
   These boys and girls are very busy. What are they doing?
   Do you like to skate?
   Does anyone in your family have a bicycle?

6. (cont'd)
Does your older brother or sister skate or ride a bicycle?
Did you ever fall off a bicycle or fall down on skates?

* The above word group and the related guiding questions were used for four teaching sessions.

Sample Picture



Appendix F

Sample Sentences and Paragraph

Name _____

1. I like to play a game of ball.
2. They try to throw the ball.
3. The girls like to jump.
4. They like to play jump rope.
5. She has a good jump rope.
6. Brother and baby jump up and down.

Name _____

1. I like to hide.
2. The cat and dog hide.
3. The boy will try to hide the rope.
4. Cars ride in the street.
5. They can ride all day.
6. Grandmother and baby like to ride.

Name _____

1. The boys like to ride in the park.
2. Birds fly in the park.
3. He has to ride in the park.
4. The boys had a good time in the park.
5. It is time to play a game.
6. We like to have a good time.

Name _____

1. They ride a bicycle.
2. Stop the bicycle in the park.
3. I will try to ride a bicycle.
4. She will skate up the street.
5. The girls skate in the park.
6. They jump rope and skate.

Name _____

Boys and girls play in the park. They play many games. The girls jump rope and skate. The boys run and hide. The boys try to ride a bicycle. They have a good time.

Appendix G

USOE MODALITY RESEARCH PROJECT

RECORD SHEET

RESEARCH ASSISTANT: _____ PRESENTATION: _____

SESSION NUMBER: _____ DATE: _____

GROUP I -- 9:00 A.M.

Words	Absent	Class	Absent	Class

GROUP II -- 9:30 A.M.

Words				

GROUP III -- 10:00 A.M.

Words				

GROUP IV -- 10:30 A.M.

Words				

GROUP V -- 11:00 A.M.

Words				

Appendix H

USOE MODALITY RESEARCH

BASIC LESSON PROCEDURE FOR ALL METHODS OF PRESENTATION

This general outline is to be followed for each lesson in each of the methods of presentation.

A. Review of words taught: (1 or 2 minutes)

Flash card or game type review. Select correct word card when it is heard.

Use our list and Bank St. Reader List. Grabbing Game. Reading and responding to instructions using the words we have taught, e.g. "Go to the window."

B. Introduction: (2 or 3 minutes)

1. Develop concept of word(s) to be taught through oral language, pictures, and/or dramatization.

2. Use suggested guiding questions in back of portfolio for each word.

3. There is no visual presentation of the word form at this point.

C. Direct Teaching: (10 minutes)

Use the outline suggested for each of the methods of presentation.
(SEE ATTACHED)

D. Application: (2 or 3 minutes)

1. Have the pupil identify the word(s) in sentences.

2. Have the pupil read the sentences and paragraph orally.

USOE MODALITY RESEARCH

DIRECT TEACHING

Auditory Presentation

1. Listen to whole word in context. Students pick word out of context. (Tape recordings)

2. Compare and contrast parts of words:

    a. beginnings
    b. middle
    c. endings

3. Match word sounds with other words they know.

4. Associate auditory sound of word with printed form.

5. Select correct printed form of word when it is spoken.

Visual Presentation

1. Associate printed word with picture.

2. Point out visual characteristics of the word. (Use overhead projector)

3. Match copies of word to model. (Have 3 or 4 words, one of which matches)

    a. flash card
    b. sentence on chart
    c. Go Fish game

4. Repeat selection of the word forms in different contexts.

Kinesthetic Presentation

1. Associate the three-dimensional form of the word with the concept. use sandpaper letters, wooden letters.

2. Touch each letter with fingers as they pronounce the word slowly.

3. Trace the word, repeat tracing until he can write the word without looking at the copy. (Tracing paper, ditto copy, clip board, crayon or pencil)

4. Use the word in a story. (write it in)

5. Use sandpaper for extra practice. Write word on sandpaper, chalkboard, or newsprint.

Direct Teaching (cont'd)

Combination Presentation

1. Associate printed word with picture.
2. Point out visual characteristics of the word.
3. Listen to whole word in context.
4. Compare and contrast parts of words
5. Trace the word using word form, tracing paper, and crayons.

Appendix I

CORRELATION COEFFICIENTS FOR WORD RECOGNITION PRETEST, WORD RECOGNITION POSTTEST, N.Y.S. READING READINESS TEST, AND METROPOLITAN READING ACHIEVEMENT TEST

	Pretest	Posttest	Reading Readiness	Met. Achievement
Pretest	---	.662 (106)*	.568 (85)	.778 (87)
Posttest		---	.577 (85)	.683 (87)
Reading Readiness			---	.633 (73)
Met. Achievement				---

* N used for correlation