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The objectives of this study were to investigate the effect of four different reading programs on the decoding and comprehension skills of second and third graders. One reading program used a basal reading series which exercised little control over the grapheme-phoneme correspondences presented in the vocabulary. The second program used a basal reading series which exercised close control over grapheme-phoneme regularity. The vocabularies of these two programs were used in the remaining two programs, which emphasized meaning contrasts within basic patterns of language structure through the use of word substitution, pattern expression and elaboration, pattern inversion, and pattern transformation. Teachers were randomly assigned, and all reading programs were new to the teachers using them. Reading achievement tests were administered to the pupils in May 1966 and May 1967. Higher decoding skills were attained when controlled regularity of grapheme-phoneme correspondences and emphasized language structure were combined in the same method than when emphasized language structure was presented alone. When used alone, grapheme-phoneme correspondences did not produce decoding skills superior to those produced by the program placing little emphasis on correspondence control. (WL)

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Robert B. Ruddell

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U.S. Department of Health, Education and Welfare
Office of Education
Bureau of Research

SUMMARY

# A Longitudinal Study of Four Programs of Reading Instruction Varying in Emphasis on Regularity of Grapheme-Phoneme Correspondences and Language Structure on Reading Achievement in Grades Two and Three*

Robert B. Ruddell
University of California, Berkeley

## Objectives

The primary objective in the second and the third year of the study was to investigate the effect on decoding and comprehension skills of four reading programs varying in (a) the degree of regularity of grapheme-phoneme correspondences programmed into the vocabulary presented, and (b) the emphasis on language structure as related to meaning. The secondary objective of the investigation was to examine the relationship between the subjects' morphological and syntactical language development in grade one, and their comprehension achievement in grade two and grade three.

Exploratory questions were designed to study the relationship between the independent background variables of mental age, socioeconomic status, sex, and chronological age, and the dependent decoding and comprehension variables. In each case this relationship was considered relative to the contrastingly different reading programs employed.

## Characteristics of Treatments

The following reading programs were selected and developed in order to provide the characteristics believed essential for testing the experimental hypothesis of the study.

Program B consisted of a basal reading series[1] which was one of two basal programs available for use in the Oakland Unified School District.

*Supported by the U.S. Office of Education, Project No. 3099, Second Year of a Longitudinal Study of Four Methods of Teaching Primary Reading, and No. 78085, Evaluation of the Third Year of a Longitudinal Study of Reading Instruction.

This series was selected for use in Program B and Program B+ because it had received no use by most teachers and only minimal use by a few second and third grade teachers. This program made little attempt to control the grapheme-phoneme regularities in the vocabulary presented. Workbooks were provided for this program by the research project.

Reading Program P consisted of a basal reader series[2] and offered detailed control of grapheme-phoneme correspondences presented in the vocabulary. This program was developed in a programmed format and was provided by the research project.

The supplementary aspects (+)[3] of Programs B+ and P+ were developed by the investigator. These two supplementary aspects were identical in nature, but different in the vocabulary used, which was drawn from Program B and Program P respectively. The supplements emphasized meaning contrasts within basic patterns of language structure through word substitution, pattern expansion and elaboration, pattern inversions, and pattern transformations. The importance of noun, verb, phrase, clause, and question markers in relation to meaning change was also emphasized. Detailed teacher plans were designed for each lesson. Words for pattern construction and manipulation were grouped on the basis of form class and printed on color-coded 1-1/4 inch wooden cubes to provide flexibility in pattern construction in developing the desired contrasting meaning changes.

## Procedure of the Study

Teachers were randomly assigned to the four treatments, and careful control was exerted over pupil and instructional variables in the twenty-two second year classrooms and the twenty third year classrooms to insure experimental equivalence throughout the study. All reading programs were used for the first time by the great majority of the second and third grade teachers. Throughout the experiment, teacher visitation was carefully equated for the various treatments. Every effort was made to insure equivalent teacher interest and enthusiasm in controlling for differences which might have been produced by the "Hawthorne effect."

Criterion tests were administered in May of 1966 and May of 1967 to evaluate second- and third-year reading achievement relative to the hypotheses of the study. These tests included the following: Word Meaning, Word Study Skills, and Paragraph Meaning subtests of the Stanford Achievement Test; Primary Test of Syntax, designed by the investigator to measure sentence meaning comprehension; Phonetically Regular Words Oral Reading Test, designed by the University of Minnesota Coordinating Research Center to meas re children's ability to decode words containing consistent correspondences; and Gates Word Pronunciation Test, administered to measure children's ability to decode words containing inconsistent correspondences. The two latter tests were administered individually to a randomly selected group of children drawn from each treatment group.

Also administered at the outset of the first grade study were modified forms of Berko's Test of Morphology and the Fraser, Bellugi, and

Brown Test of Syntax. These tests were administered individually to 160 randomly selected children (40 subjects from each treatment group) and were used in measuring the subjects' control over specific aspects of their morphological and syntactical language systems relative to the secondary objective of the study.

## Treatment of Data

The analysis of covariance followed by F tests between means was used to test the first two hypotheses, encompassing the primary objective of the study, and also in the analysis of the exploratory questions. The covariate for each criterion variable consisted of the first grade readiness variable which was found to correlate most highly with the dependent variable under consideration. The covariate in each case was the Murphy-Durrell Diagnostic Reading Readiness Test. The third hypothesis relative to the secondary objective of the study was tested, using the Pearson Product-Moment Correlation.

## Conclusions and Implications

The following conclusions must be considered within the limitations of the investigation.

1. The treatment which controlled regularity of grapheme-phoneme correspondences and emphasized language structure (P+) produced consistently higher decoding skills than did the treatment which did not control correspondences but emphasized language structure (B+). These findings were not only identified with the main effects but also were noted with some regularity for various categories of mental age, socioeconomic status, and for girls, at year two and year three. These differences ranged from .3 of a year to 1.2 years, thus suggesting the practical significance of the findings.

2. The treatment which did not control for consistency of correspondences (B) produced consistently higher Word Study Skills achievement at year two than did the treatment which carefully controlled the correspondences (P). This difference also appeared to be consistent for various levels of mental age and socioeconomic status, and apparently was of greater advantage to boys for year two. The differences ranged from .7 of a year to 1.8 years, thus emphasizing the practical significance of the difference.

These findings suggest that at year two and year three, the language structure supplement (+) interacted more favorably with Program P in the P+ treatment than with Program B in the B+ treatment on decoding skills achievement. It is suggested that this different interaction may have been produced because of reinforcement variation stemming from the different vocabulary used in the P+ and B+ supplements. This possible explanation deserves careful consideration in future research.

It is evident from the findings that the precise control of the consistency of grapheme-phoneme correspondences (P) in the vocabulary used did not produce the expected superiority in decoding skills when contrasted with the program placing little emphasis on correspondence control (B) for the second and third years of the study. When one considers the carefully developed control of teacher (the same teachers taught the subjects at both first and second grade) and pupil variation, as well as the use of blocking and covariate analysis, the results would appear to be due to program variation. It should be stressed, however, that the second and the third year findings on the decoding variables are to a large extent in reverse of the first year findings,[4] which favored the treatment emphasizing careful control (P) over the grapheme-phoneme correspondences. Hence the early decoding advantage offered in the program emphasizing consistent control over correspondences decreased to a great extent by the end of second grade, where the program which did not control the consistency of correspondences held a distinct advantage. This may suggest that the important variable which explains the reverse findings for year two and year three is the introduction of the correspondences, which occurred later in the treatment emphasizing little correspondence control, rather than the careful control over consistent relationships presented in the vocabulary. It is also possible that certain children, such as the high mental age and high socioeconomic status subjects, are able to arrive at their own decoding generalizations through extensive reading at home and in school, and as a result gain little advantage from the careful control of grapheme-phoneme correspondences. These various hypotheses deserve research consideration. Additionally, an intensive research effort is needed to explore the psychological reality of linguistic units (e.g., phonemes, morphophonemes, morphemes, and their graphic equivalents) used in the decoding phase of reading programs. The relationship between children's perceptual and conceptual development, the various linguistic units and reading achievement should be examined in future research.

An early benefit, observed in the first grade study, which might be attributed to superior decoding skills resulting from the program exerting careful control over correspondences, was the more extensive reading of trade books.[5] Consideration should thus be given to the careful selection of superior characteristics of diverse reading programs at various developmental levels and the possible incorporation of these characteristics into a total instructional program in the classroom, leading to superior decoding and comprehension achievement.

3. At year two the treatment which controlled correspondences and emphasized language structure as related to meaning (P+) produced consistently higher Sentence Meaning (trend) and Paragraph Meaning comprehension skills achievement than did the treatment which emphasized only control over correspondences (P). These findings at year two were consistent to a high degree for high and low socioeconomic status subjects as well as for high mental age subjects, and boys. These findings appear to be of practical significance as reflected in scores ranging from .3 to .9 of

a year, and suggest that a balanced emphasis should be developed between decoding and comprehension skills in reading instruction. Again, various positive characteristics of reading programs should be considered, and an attempt should be made to incorporate these characteristics into the total instructional program. It is emphasized, however, that this recommendation should be studied in future research.

4. At year two the treatment which did not place special emphasis on grapheme-phoneme correspondences, nor use the language structure supplement (B), was found to produce superior Paragraph Meaning comprehension achievement over the parallel treatment using the structural supplement (B+). Consistent differences in the same direction were also noted for high socioeconomic subjects and girls at year two. Ranging from .3 to .5 of a year, these findings would appear to be of practical significance. An inspection of the data reveals that subjects in the former treatment possessed decoding skills markedly superior to those in the latter treatment (.9 of a year on the Word Study Skills variable at year two). This difference in decoding skills may partially explain the comprehension variation observed above and, as previously discussed, may have been due to the instructional time differential favoring treatment B. These findings indicate that treatment B possesses a definite superiority over treatment B+. Future research, however, should examine these treatments under conditions utilizing equivalent instruction time for Program B in treatments B and B+. Additional provision should be made for the 15 minutes used three times each week for instructional supplement (+). This recommendation is made in light of the comprehension differences found favoring treatment P+ over treatment P.

5. The significant relationship observed between the subjects' control over morphological and syntactical elements in oral language and their Sentence and Paragraph Meaning comprehension suggests the need to weigh carefully significant interrelationships in language skills development. Concern should be given to possible use of the former elements in reading readiness instruments. Classroom teachers should also possess an awareness of the potentially important role which these dimensions of oral language play in reading achievement. This concern receives support from the research of Graves[6] and Hartson,[7] which was directly connected with data collected in this investigation.

6. The possible transfer value of decoding and reading comprehension skills to encoding, written expression, and oral communication skills also deserves further study. This was not the primary concern of the immediate investigation, but supportive evidence may be found in the research of Henry,[8] Ahern,[9] Baele,[10] and Crawford.[11] These studies were likewise directly connected with data collected in the present investigation.

7. As the investigator designed and conducted this longitudinal study he was constantly aware of the need for more refined measuring instruments which could be utilized in tapping specific dimensions of reading achievement. For the present study it was necessary to design decoding, comprehension, and oral language measures. It is believed that the standardized instruments which were available were of limited value because of their gross nature. This area should be given careful study

and a variety of instruments should be constructed to measure various specific facets of decoding, comprehension, and attitudinal factors in reading.

## A Concluding Statement

A basic objective of this longitudinal investigation was to provide increased insight into the relationship between unique characteristics of reading programs and the reading achievement of primary school children. A secondary objective was also concerned with the relationship between oral language variables and reading achievement. The research design, the data collected, and the resulting conclusions have made provision for the above objectives only in part. As with the great majority of research projects, this study raises many questions which will require future consideration within controlled laboratory settings and in field research settings. Its value lies mainly in the provision of significant information through an experimental approach to determine the relationship between reading program characteristics, pupil characteristics, and reading achievement in realistic classroom settings.

There is a continued need to conduct carefully controlled longitudinal research studies of this nature if recently developed programs possessing characteristically new and different instructional approaches are to be evaluated. This approach, combined with laboratory experimentation, is essential if reading researchers and classroom teachers are to obtain further understanding of the relationship between reading program characteristics, pupil characteristics, and reading achievement.

Notes to Summary

[1]William D. Sheldon et al., Sheldon Basic Reading Series (New York: Allyn and Bacon, Inc., 1957).

[2]Cynthia Dee Buchanan, Programmed Reading (New York: McGraw-Hill Book Co., Inc., 1963).

[3]Robert B. Ruddell, A Longitudinal Study of Four Programs of Reading Instruction Varying in Emphasis on Regularity of Grapheme-Phoneme Correspondences and Language Structure on Reading Achievement in Grades Two and Three (University of California, Berkeley, 1968). Supported by the U.S. Office of Education, Projects 3099 and 78085.

[4]Robert B. Ruddell, The Effect of Four Programs of Reading Instruction with Varying Emphasis on the Regularity of Grapheme-Phoneme Correspondences and the Relation of Language Structure to Meaning on Achievement in First-Grade Reading (University of California, Berkeley, 1965). Supported by the U.S. Office of Education, Project 2699. Pp. 43, 51.

[5]Ibid., p. 170.

[6]Barbara W. Graves, "A Comparative Study of the Reading Achievement and Syntactical Language Development of Two Socioeconomic Groups" (unpublished Master's thesis, School of Education, University of California, Berkeley, 1966).

[7]Eleanor K. Hartson, "The Relationship Between Oral Language Development and Written Language of First and Second Grade Children: A Comparison of Socioeconomic Groups" (unpublished Master's thesis, School of Education, University of California, Berkeley, 1967).

[8]Harold L. Henry, "The Effect of Contrasting Reading Programs with Varying Emphasis on the Regularity of Phoneme-Grapheme Correspondences on Third Grade Spelling Achievement" (unpublished Doctoral Dissertation, School of Education, University of California, Berkeley, 1967).

[9]Evelyn J. Ahern, "The Effect of Four Primary Reading Programs on the Complexity of Written Language Structure at the Second Grade Level" (unpublished Doctoral Dissertation, School of Education, University of California, Berkeley, 1967).

[10]Ernest R. Baele, "The Effect of Primary Reading Emphasizing Language Structure as Related to Meaning upon Children's Written Language Achievement at the Third Grade Level" (unpublished Doctoral Dissertation, School of Education, University of California, Berkeley, 1968).

[11]Leslie W. Crawford, "The Relationship between Two Varying Primary Reading Programs and Selected Syntactical Variables in Children's Language Development" (unpublished Doctoral Dissertation, School of Education, University of California, Berkeley, 1967).

## ACKNOWLEDGMENTS

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The solution to the many budgetary problems and secretarial support was greatly facilitated by the assistance of Mrs. Gertrude Funkhouser. During the last two years of the study the secretarial requirements of the project were completed most successfully by Mrs. Cynthia Cowee.

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of vital importance to the success of the project. Her role ranged from aiding in the coordination of individual testing to work on data analysis.

And finally, the writer feels special tribute should be given to his wife Annette, for the encouragement and understanding attitude which she has provided while directing her own third and fourth grade classroom, and more recently as mother to our new daughter, Amy Rebecca.

R.B.R.

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# CHAPTER I

## HYPOTHESES, RELATED RESEARCH, AND VARIABLES EXAMINED

The research reported in this monograph is primarily concerned with the development of decoding and comprehension skills of primary grade children. Thus the basic objective in the second and third year of the study was to investigate the effect on children's word recognition and reading comprehension of published and specially prepared reading programs varying in (a) the degree of regularity of grapheme-phoneme correspondences programmed into the vocabulary presented, and (b) the emphasis on language structure as related to meaning.

The secondary consideration of the investigation encompassed the study of the relationship between selected oral language variables and reading achievement in the reading programs. The language variables consisted of specific aspects of the children's morphological and syntactical language systems.

## Hypotheses of the Study

In the second and the third year of the investigation the following experimental hypotheses were tested.

1. Second and third grade reading programs possessing a high degree of consistency in grapheme-phoneme correspondences in the vocabulary introduced (Program P, Program P+) will produce significantly higher (a) word meaning, (b) word study skills, (c) regular word identification, and (d) irregular word identification achievement scores, than will the reading programs making little provision for consistent correspondences (Program B, Program B+).

2. Second and third grade reading programs placing special emphasis on language structure as related to meaning (Program B+, Program P+) will produce significantly higher (a) paragraph meaning comprehension, and (b) sentence meaning comprehension achievement scores, than will reading programs placing no special emphasis on language structure as related to meaning (Program B, Program P).

3. Paragraph meaning comprehension and sentence meaning comprehension of second and third grade subjects at the end of grades two and three, respectively, are a function of the control which the subjects exhibit over designated aspects of (a) their morphological language system, and (b) their syntactical language system, as measured at the beginning of grade one.

Four exploratory questions were established to study the relationship between subject background variables and the word recognition and

comprehension achievement in each of the reading programs studied. These are stated as follows:

.....Are there significant differences in (a) decoding, and (b) reading comprehension achievement in the different reading programs among children of different mental age levels?

.....Are there significant differences in (a) decoding, and (b) reading comprehension achievement in the different reading programs among children of different levels of socioeconomic status?

.....Are there significant differences in (a) decoding, and (b) reading comprehension achievement in the different reading programs among males and females?

.....Are there significant differences in (a) decoding, and (b) reading comprehension achievement in the different reading groups among children of different chronological age levels?

## Related Research

The basic task of reading in the initial stages involves discovering what sort of correlation exists between the printed units and their oral counterparts, and in understanding the manner in which various groups of written words function together to transmit meaning.

The child who is successful in the reading act must achieve control over the utilization of grapheme-phoneme correspondences or some larger decoding unit. Gibson has expressed the view that the reader accomplishes

this whether he is aware of it or not.[1] Francis presented the hypothesis that the beginning reader moves from the written symbol through the oral counterpart to the meaning of a communiqué and that consistent writing-to-speech correlation would seem desirable.[2] The recommendation that initial words be introduced on the basis of grouped consistencies has been proposed by Soffietti,[3] Fries,[4] Smith,[5] Hall,[6] and Bloomfield.[7] These individuals expressed the opinion that the inconsistencies of the English orthography place a limitation on the acquisition of sound-symbol correspondences as presently developed in reading textbooks.

Although the results have been inconsistent in investigations placing varying degrees of emphasis on sound-symbol correspondences and related generalizations, some early studies revealed superior results for

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[1] Eleanor J. Gibson, et al. "The Role of Grapheme-Phoneme Correspondences in the Perception of Words," American Journal of Psychology, 75:554-570 (December, 1962).

[2] W. N. Francis, "Language, Speech, and Writing." Winter Study Group in Reading, Indiana University, Bloomington, Indiana, 1963. (Mimeographed)

[3] J. P. Sofietti, "Why Children Fail to Read: A Linguistic Analysis," Harvard Educational Review, 25:63-84 (Spring, 1955).

[4] Charles C. Fries, Linguistics and Reading.

[5] Henry Lee Smith, Jr., Linguistic Science and the Teaching of English, 61 pp.

[6] Robert A. Hall, Jr., Sound and Spelling in English.

[7] Leonard Bloomfield, Language.

phonic methods at early grade levels, particularly in word recognition.[8,9,10,11] More recently the work of Hayes,[12] Ruddell,[13] Hahn,[14] Tanzer and Alpert,[15] Mazurkiewicz,[16] and Downing,[17] have also lent support to the value of greater consistency in the introduction of sound-letter correspondences. Thus it was hypothesized that the second and third grade reading programs possessing a high degree of consistency in grapheme-phoneme correspondences in the vocabulary introduced (Program P,

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8 Donald C. Agnew, The Effect of Varied Amounts of Phonetic Training on Primary Reading. Duke University Research Studies in Education, No. 5. Durham, N.C.: Duke University Press (1939).

9 D. E. Bear, "Phonics for First Grade: A Comparison of Two Methods," Elementary School Journal, 59:394-402 (1958).

10 Barbara Cline Kelley, "The Economy Method Versus the Scott, Foresman Method in Teaching Second-Grade Reading in the Murphysboro Public Schools," Journal of Educational Research, 51:465-469 (1958).

11 Paul E. Sparks and Leo C. Fay, "An Evaluation of Two Methods of Teaching Reading," Elementary School Journal, 57:386-390 (April, 1957).

12 Robert B. Hayes, "ITA and Three Other Approaches to Reading in First Grade," The Reading Teacher, 19:627-630 (May, 1966).

13 Robert B. Ruddell, "Reading Instruction in First Grade with Varying Emphasis on the Regularity of Grapheme-Phoneme Correspondences and the Relation of Language Structure to Meaning," Reading Teacher, 19:653-660 (May, 1966).

14 Harry T. Hahn, "Three Approaches to Beginning Reading Instruction," Reading Teacher, 19:590-594 (May, 1966).

15 Harold J. Tanyzer and Harvey Alpert, "Three Different Basal Reading Systems and First Grade Reading Achievement," Reading Teacher, 19:636-642 (May, 1966).

16 Albert J. Mazurkiewicz, "ITA and TO Reading Achievement When Methodology Is Controlled," Reading Teacher, 19:606-610 (May, 1966).

17 J. A. Downing, "The I.T.A. (Initial Teaching Alphabet) Reading Experiment," Reading Teacher, 18:105-110 (November, 1964).

Program P+), would produce significantly higher decoding achievement than the reading programs making little provision for consistent correspondences (Program B, Program B+).

The high degree of development of primary grade children's oral language and the interrelationship between oral language and reading achievement has been recognized in the research literature. Strickland[18] and Loban[19] have revealed that oral patterns of language structure of first grade children are well developed. Miller and Ervin,[20] Berko,[21] and Fraser, Bellugi, and Brown[22] recently reported on the high degree of control which preschool children demonstrate in their use of morphological and syntactical language structures.

Research by Ruddell[23] has shown that reading comprehension scores at the fourth grade level are significantly higher on reading passages using only high frequency patterns of the children's oral language structure in comparison with reading passages encompassing only low frequency patterns

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18 Ruth G. Strickland, The Language of Elementary School Children: Its Relationship to the Language of Reading Textbooks and the Quality of Reading of Selected Children.

19 Walter D. Loban, The Language of Elementary School Children.

20 Wick R. Miller and Susan Ervin, "The Development of Grammar in Child Language," Monographs of the Society for Research in Child Development, 29:9-34 (1964).

21 Jean Berko, "The Child's Learning of English Morphology," Word, 14:150-177 (1958).

22 Colin Fraser, Ursula Bellugi, and Roger Brown, "Control of Grammar in Imitation, Comprehension, and Production," Journal of Verbal Learning and Verbal Behavior, 2:121-135 (August, 1963).

23 Robert B. Ruddell, "The Effect of the Similarity of Oral and Written Patterns of Language Structure on Reading Comprehension," Elementary English, 42:403-410 (April, 1965).

of their oral language. From their study of contextual associations of children ranging from eight to thirteen years of age, Werner and Kaplan[24] concluded that the reader must understand the nature of the sentence "as a stable and articulate structure" if he is to understand the words presented.

Even though the child has control over varied patterns of language structure in his oral language, as shown by previously mentioned research, this does not necessarily insure that he will experience success in dealing with these same patterns in graphic form. A greater burden is placed on the early reader because the graphic forms carry little obvious prosodic information, and an understanding of the clues expressing specific relationships between words in written language must be developed. Lefevre,[25] Strickland,[26] and Allen[27] have suggested that primary grade reading programs should be designed to encompass a study of suprasegmental elements, word order, and syntax in facilitating maximum transfer from the child's already well-developed spoken language structure, to written language, thus enhancing his comprehension of the latter.

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[24] J. Werner and E. Kaplan, The Acquisition of Word Meanings: A Developmental Study.

[25] Carl A. Lefevre, Linguistics and the Teaching of Reading.

[26] Ruth G. Strickland, The Contribution of Structural Linguistics to the Teaching of Reading, Writing, and Grammar in the Elementary School.

[27] Robert L. Allen, "Better Reading Through the Recognition of Grammatical Relations," Reading Teacher, 18:194-198 (December, 1964).

Research and opinion suggest that an instructional program designed to develop an understanding of the relationship between the child's familiar spoken system of communication and the written language system would facilitate his ability to comprehend written material. It was therefore hypothesized that the second and third grade reading programs placing special emphasis on language structure as related to meaning (Program B+, Program P+) would produce significantly higher reading comprehension skills than the reading programs placing no special emphasis on language structure as related to meaning (Program B, Program P).

It has been theorized that the degree of development of the child's morphological and syntactical systems is directly related to his success in learning to read. The initial stage of reading as described by the language model of Francis involves the association of the graphological and phonological systems. This is followed by direct involvement of the grammatical system encompassing the morphological and syntactical systems, which enables the semantic aspect of word association and meaning to be utilized by the child.[28] Findings from research by Ruddell lend support to the latter statement.[29] Miller has also shown experimentally that an individual must assign a constituent structure to a sentence in order to understand it.[30] It was thus hypothesized that in the early stages of the

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[28] Francis, op. cit.

[29] Robert B. Ruddell, "Variation in Syntactical Language Development and Reading Comprehension Achievement of Selected First Grade Children," Vistas in Reading, International Reading Association, 11:420-425 (1966).

[30] George A. Miller, "Some Psychological Studies of Grammar," American Psychologist, 17:748-62 (November, 1962).

reading process a child's comprehension achievement is a function of the control which he exhibits over specific aspects of his morphological and syntactical systems.

## Common Terminology Used in Study

The following terms are used throughout the study. Several of these concepts will be defined more completely in Chapter II. It will be of value to the reader, however, if an operational understanding of these concepts can be developed at this point in the monograph. The concepts are as follows.

High degree of consistency in grapheme-phoneme correspondences. The high degree of consistency refers to the control of the regularities of grapheme-phoneme correspondences in the vocabulary presented. This control is operationally defined by the introduction and sequencing of correspondences in Program P.

Low degree of consistency in grapheme-phoneme correspondences. The low degree of consistency refers to the absence of emphasis on controlling the regularity of grapheme-phoneme correspondences in the vocabulary presented. This control is operationally defined by the introduction and sequencing of correspondences in Program B.

Emphasis on language structure as related to meaning. The emphasis on language structure as related to meaning refers to the presentation of a variety of basic patterns of language structure in which the relationship of words and word groups to meaning change is stressed. Operationally

this emphasis is defined by the supplementary aspect ( + ) of Program B+ and of Program P+ .

Program B. Program B refers to the Allyn-Bacon Basal Reading Series, which makes little provision for consistent grapheme-phoneme correspondences in the vocabulary introduced, and little provision for emphasis on language structure as related to meaning. A more extensive description of this program will be found in Chapter II.[31]

Program P. Program P refers to the McGraw-Hill Reading Series, a set of programmed reading materials with vocabulary utilizing consistent grapheme-phoneme correspondences to a high degree, but placing little emphasis on language structure as related to meaning. In Chapter II a more extensive description of this program is given.[32]

Program B+ . Program B+ refers to a basal reading series (Program B) supplemented by materials designed to build an awareness and understanding of language structure as related to meaning. A more extensive description of this program is presented in Chapter II.

Program P+ . Program P+ refers to a set of programmed reading materials (Program P) supplemented by materials designed to build an awareness and understanding of language structure as related to meaning. See Chapter II for a more extensive description of this program.

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[31] William S. Sheldon and others, Sheldon Basic Reading Series.

[32] Cynthia Buchanan, Programmed Reading.

## Dependent Variables Defined

A select group of dependent variables were considered relative to the hypotheses formulated. These are indicated below.

Word Meaning: A measure of the subject's ability to select the correct word in a sentence completion task from a multiple-choice item of four words. This is a subtest of the Stanford Achievement Test.[33]

Word study skills: The subject's ability to identify initial and final consonant correspondences in word contexts read by the examiner, the identification of a series of words read by the examiner, and the identification of words that rhyme with those read by the examiner. This is a subtest of the Stanford Achievement Test.[34]

Regular word identification: The subject's ability to pronounce words possessing "short" vowel correspondences, "long" vowel correspondences as signaled by the final e and the initial letter in diagraphs, "long" vowel sounds as related to the "open syllable" rule, and the diphthongs. This variable was measured by the Phonetically Regular Words Oral Reading Test designed by a committee working with the Coordinating Center at the University of Minnesota.[35]

Irregular word identification: The subject's ability to decode words possessing irregular correspondences. This variable was measured by the Gates Word Pronunciation Test.[36]

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[33] T. L. Kelley and others, Stanford Achievement Test, Primary II, Form W. (Second year study); Primary II, Form X (Third year study).

[34] Kelley and others, op. cit.

[35] See Appendix C.

[36] See Appendix C.

Vocabulary: The word refers to a measure of the subject's ability to select the correct word corresponding to a definition presented orally from a multiple-choice item of three words. This is a subtest of the Stanford Achievement Test.[37]

Paragraph meaning comprehension: The subject's ability to respond to connected discourse by selecting the proper response to a deleted word from four possible items. This was a subtest of the Stanford Achievement Test.[38]

Sentence meaning comprehension: This refers to the subject's ability to comprehend sentence meaning in written discourse as related to picture items. The following types of grammatical contrasts were evaluated: Mass and count nouns; singular and plural r ·ns marked by inflections; singular and plural nouns marked by is and are; present progressive tense and past tense; present progressive tense and future tense; affirmative and negative; singular and plural of third person possessive pronouns; subject and object in the active voice; subject and object in the passive voice; and the direct and the indirect object. This variable was measured by the Primary Test of Syntax designed by the investigator.[39]

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[37] Kelley and others, op. cit.

[38] Kelley and others, op. cit.

[39] See Appendix B.

## Independent Variables Defined

In this study the following independent variables were considered relative to the third hypothesis, dealing with the relationship between comprehension and children's morphological and syntactical language development. The variables pertinent to the four exploratory questions are also described.

Morphological language development: The subject's oral language ability to produce the plural and two possessives of the noun, the third person singular of the verb, the progressive and the past tense, and the comparative and the superlative of the adjective. The ability to produce the derived agentive or compound was also measured. Item responses were scored by following the method described in Berko's research. This variable was measured by utilizing Berko's Test of Morphology.[40]

Syntactical language development: The subject's oral language ability to imitate, comprehend, and produce the types of grammatical contrasts previously described in the definition of "sentence meaning comprehension." The item responses were scored by utilizing the "Production" scoring procedure described by Fraser, Bellugi, and Brown. This variable was measured by utilizing their Test of Syntax.[41]

Mental age: A measure of mental age normally expressed in years and months. In this study, however, the raw score obtained on the Pintner-

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[40] Berko, op. cit.

[41] Fraser and others, op. cit.

Cunningham Primary Test of General Ability, Form A, was used to define this variable.[42]

Socioeconomic status: The occupational status of parents as classified on the basis of particular occupations. This classification was based on the Minnesota Scale for Paternal Occupations indicating the probable socioeconomic level of children.[43]

Chronological age: A measure of a child's life age as expressed in years and months.

Reading readiness: The development of specific abilities as operationally defined by the Metropolitan Readiness Test, Murphy-Durrell Diagnos c Reading Readiness Test, and the Thurstone Pattern Copying and Identical Forms Test.

## Limitations and Delimitations

The conclusions of the study are restricted by the inherent reliability and validity of the instruments used. Generalizations based on the conclusions of the study are limited by the pupil population from which the sample was drawn.

At the outset of the investigation twenty-four classrooms had been selected from the first grade student population of the Oakland Unified School District, Oakland, California. The students in the second year of

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[42] Rudolf Pintner and others, Pintner-Cunningham Primary Test, Form A.

[43] University of Minnesota, Institute of Child Welfare, The Minnesota Scale for Paternal Occupations.

the study represented twenty-two classrooms; in the third year of the study twenty classrooms were represented. From the population selected for the first-year study, 160 subjects had been selected to constitute a subpopulation used in obtaining data through individually-administered measures. The pupils from this subpopulation who remained in the second and third year of the study were used to provide longitudinal information. Additional subjects were selected at random from the total remaining population to maintain the magnitude of the subpopulation. Information relative to this consideration has been provided in Chapter III.

Children enrolled in special education classes for the mentally retarded were excluded from the sample.

# CHAPTER II

# METHODOLOGY AND RESEARCH DESIGN

The major objective of this study was to examine the effect on children's decoding and comprehension skills of four primary grade reading programs varying in (a) the regularity of grapheme-phoneme correspondences, and (b) the emphasis on language structure as related to meaning. A minor objective considered the relationship between morphological and syntactical language development in grade one and reading comprehension achievement in grades two and three.

## General Plan of Years Two and Three

This report of the second and the third year of the longitudinal study encompasses the period of two school years from September 1965 to May 1967. Twenty-four first grade classrooms in the Oakland Unified School District, Oakland, California, had been selected for the first year of the study in September 1964. These classrooms were selected at that time to represent

a wide range of socioeconomic levels. As indicated by the 1960 census report, eight of the classrooms were located in the lowest income areas and eight in the highest income areas of the school district. The remaining eight classrooms represented the middle income range. The teachers representing classrooms on each income level had been randomly assigned to each of the four treatment groups (Programs B,P,B+,P+).[1]

Reading Program B, a basal reader,[2] was one of two basal programs available for use in the Oakland Unified School District. It was necessary to provide workbooks for this program for the three years of the study. This basal reader series was selected for use in Program B and Program B+ because it had not been previously utilized by the teachers in the investigation. Reading program P[3] was provided for the three years by the research project. Thus it was insured that all reading programs were used for the first time by the teachers participating in the study.

The supplementary aspects (+) of Programs B+ and P+, emphasizing language structure as related to meaning, were developed by the investigator. This was accomplished by utilizing information from recently

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[1] Robert B. Ruddell, The Effect of Four Programs of Reading Instruction with Varying Emphasis on the Regularity of Grapheme-Phoneme Correspondences and the Relation of Language Structure to Meaning on Achievement in First Grade Reading, p. 24.

[2] William D. Sheldon and others, Sheldon Basic Reading Series.

[3] Cynthia Dee Buchanan, Programmed Reading.

published research studies,[4] texts,[5] and curriculum center materials.[6] His own background in linguistics, psychology, and reading methodology, coupled with reactions obtained from specialists in these areas, proved to be of significant value in synthesizing available information for the program development.

Under the "rotating grade plan" used widely in the Oakland Unified School District, the teachers of the first grade followed their classes into the second grade. Thus the random assignment of teachers to treatment groups effected at grade one in September 1964 automatically provided for randomization of teachers to treatment groups at the second grade level. It should be noted, however, that two classes were consolidated at the outset of the second year. The first consolidated class was in the P program at Ralph Bunche School, and a second was from the P+ treatment at Allendale School. This consolidation resulted from high pupil attrition in these two schools.

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[4] Walter D. Loban, The Language of Elementary School Children; Ruth G. Strickland, The Language of Elementary School Children: Its Relationship to the Language of Reading Textbooks and the Quality of Reading of Selected Children; Ruth G. Strickland, The Contribution of Structural Linguistics to the Teaching of Reading, Writing, and Grammar in the Elementary School.

[5] Enola M. Borgh, Grammatical Patterns and Composition; Noam Chomsky, Syntactic Structures; Carl A. Lefevre, Linguistics and the Teaching of Reading; Walter D. Loban, Margaret Ryan, and James R. Squire, Teaching Language and Literature; Paul Roberts, English Sentences; Owen Thomas, Transformational Grammar and the Teacher of English.

[6] University of Nebraska, Nebraska Curriculum Development Center, Curriculum for English.

In the third year of the study the second grade pupils progressed into the third grade classroom taught by the teacher who would normally receive that class. All third grade teachers were new to the study. At this stage of the investigation two additional classes were lost. This loss resulted from the complete consolidation of Grant School, where a class in Program B was divided to attend several other schools, and from pupil attrition in Longfellow School where a class using Program B+ was discontinued. It is interesting to observe that one class from each of the four treatments had been lost from the study by the outset of the third year. Three of the classes (B, B+, and P) were lost from the lowest income area of the district and one class (P+) from the middle income area.

An initial workshop was held at the opening of the second grade and third grade school years. These one and one-half day workshops were held to familiarize the teachers with the basic instructional rationale and the instructional methodology, and to provide an overview of the design for the research project. Five teacher workshops were held during each of the consecutive years. Provision for equal visitation and workshop time for all teachers in all treatment groups was carefully controlled throughout the investigation. The above considerations were believed essential in making provision for generating equivalent teacher interest in controlling for differences which might have been produced by the "Hawthorne effect."

The time devoted to the reading instruction period was held constant for each of the four treatment groups during the second and the third year

of the study. The first group of subjects in Program B and in Program P devoted 60 minutes in the morning to reading; the second group in each program devoted 60 minutes in the afternoon to the same activity. Both programs thus used the split-group plan[7] common to the school district. On alternate days of each week the first group of subjects in Program B+ and Program P+ likewise utilized the split-group plan, devoting 45 minutes in the morning to basal reading; the second group devoted 45 minutes in the afternoon to the basal reading programs common respectively to Program B and Program P. The remaining 15 minutes in the morning and afternoon for subjects in Program B+ and Program P+ were utilized for the supplementary program emphasizing language structure as related to meaning. During the remaining days of each week, subjects in treatments B+ and P+ followed the instructional time plan used for the subjects in treatments B and P.

During the first month of the 1964 school year (the first year of the study) the following tests had been administered to all subjects: Metropolitan Readiness Test, Form A; Murphy-Durrell Diagnostic Reading Readiness Test; Thurstone Pattern Copying and Identical Forms Test; and the Pintner-Cunningham Primary Test of General Ability, Form A. Modified forms of Berko's Test of Morphology[8] and Fraser, Bellugi, and Brown's Test of

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[7] Under the split-group reading plan the first group of pupils in the reading class arrives at 8:45 A.M., and reading is taught until 9:45 A.M. At 9:45 A.M. the second group of pupils joins the class. At 2:00 P.M. the pupils who came to school at 8:45 A.M. leave the class, and the pupils who entered school at 9:45 A.M. have reading class from 2:00 P.M. until 3:00 P.M.

[8] Jean Berko, "The Child's Learning of English Morphology," Word, 14:150-177 (1958).

Syntax[9] were administered individually to 160 randomly selected children (40 subjects from each treatment group). The first four tests mentioned above were administered in order to provide potential covariates for the criterion variables administered at the end of the second and the third year. The latter two tests were used in measuring the subjects' control over specific aspects of their morphological and syntactical language systems relative to the third hypothesis of the study.

In May of 1966 and 1967 a battery of criterion tests was administered to evaluate reading achievement relative to the hypotheses of the study. These included the following: Word Reading, Word Study Skills, Paragraph Meaning, and Vocabulary subtests of the Stanford Achievement Test; the Primary Test of Syntax designed by the investigator to measure sentence meaning; the Phonetically Regular Words Oral Reading Test designed by the University of Minnesota Coordinating Research Center to measure children's ability to decode words containing consistent correspondences; and the Gates Word Pronunciation Test administered to measure children's ability to decode words containing inconsistent correspondences. The last two tests were administered individually to the randomly selected group of children drawn from each treatment group. Other criterion measures were administered for the purpose of data collection for the Coordinating Center at the University of Minnesota.[10] These data did

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[9] Colin Fraser, Ursula Bellugi, and Roger Brown, "Control of Grammar in Imitation, Comprehension, and Production," J. of Verbal Learning and Verbal Behavior, 2:121-135 (August 1963).

[10] The Coordinating Center at the University of Minnesota, Minneapolis, under the direction of Dr. Guy Bond and Dr. Robert Dykstra, served as the liaison between the thirteen remaining U.S. Office-Sponsored Research Projects during the second year. This was for the purpose of coordinating, collecting, and treating common data.

not relate to the hypotheses of this study; however, a list of the tests administered and the data collected may be found in Appendix F of this study.

## Characteristics of Instructional Materials

The following description outlines the characteristics of the published and project-developed materials utilized in the investigation.

1. Program B: A basal reader program, the Allyn-Bacon Reading Series.[11]

   a. Grapheme-phoneme regularities are not controlled in the vocabulary presented.

   b. Emphasis on phonic training in establishing grapheme-phoneme correspondences is initiated at primer level.

   c. Initial stages of phonic training deal with initial and final consonant graphemes and phonemic correspondences.

   d. Second-grade phonic training encompasses initial consonants, final consonants, consonant blends and digraphs, long and short vowel sounds for a,e,i,o,u,y and vowel digraphs.

   e. Third-grade phonic instruction reinforces many of the skills previously taught, introduces specific initial and final consonant blends (e.g., initial - scr, squ; final -tch), presents specific variations in vowels represented by different

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[11] Sheldon, op. cit.

graphemes, develops generalizations involving vowel-graphemes in context with the consonant-graphemes r, l, and w, and considers the concept of syllable.

f. No specific emphasis on language structure as related to meaning is provided.

g. Program encompasses teacher's manual, basal reader, and workbook materials.

2. Program P: A basal reading program, the McGraw-Hill Reading Series.[12]

a. Grapheme-phoneme regularities are controlled and programmed in the reading materials presented.

b. Emphasis on phonic training in establishing grapheme-phoneme correspondences is initiated in the prereading materials.

c. Initial stages of phonic training deal with the short a, the schwa, and four initial consonant sounds.

d. Second grade phonic training encompasses reinforcement of initial consonants, final consonants, consonant digraphs, and short vowels introduced in the first grade program. Vowel digraphs and diphthongs receive most introductory emphasis.

e. Third grade phonic instruction reinforces many of the skills taught previously, introduces initial, medial, and final consonant digraphs (e.g., initial -sc; medial -ph, final -gh),

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[12]Buchanan, op. cit.

presents a wide variety of variations in vowels represented by different graphemes, and develops generalizations related to suffixes.

f. No specific emphasis on language structure as related to meaning is provided.

g. Program encompasses teacher's manual, and basal reader materials in programmed format.

3. Program B+ — Language structure as related to meaning designed to supplement the Allyn-Bacon Reading Series (Program B).

a. All elements in B, excepting the lack of emphasis on language structure as related to meaning, were common to this program.

b. The vocabulary introduced and developed in Program B was used in the materials and exercises in the supplementary aspects of this program. It was considered essential that the children be familiar with the vocabulary in order that emphasis might be focused on the way words and groups of words function together in conveying meaning.

c. The various topics were introduced and developed inductively through class discussion and participation which were motivated and guided by the teacher. From the discussion and participation, examples illustrating specific concepts were developed, and pupils individually or in small groups attempted to construct similar examples to convey the intended meaning of a concept.

d. Materials available for the children's use consisted of individual word cards and one and one-half inch cubes depicting words with which the children had become familiar. The words on the cards and blocks were grouped on the basis of form class. These materials provided for ease and flexibility in constructing examples of language patterns and various expansions of these patterns in conveying the intended meanings of a concept. Special mimeographed materials were prepared to encompass the concepts presented below, using the familiar vocabulary from Program B. The reading materials from Program B were also utilized by locating and emphasizing specific structural concepts.

e. Lesson plans utilized the basic sentence patterns used most frequently by primary grade children as identified in the oral language research by Strickland.[13] The lessons systematically developed the manipulation of structural elements within sentence patterns, thus providing for individual concrete kinesthetic experiences.

f. Emphasis on oral and written language structure as related to meaning characterized the concepts developed in this program. Detailed teacher plans were developed for each lesson. The following topics were included:

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13 Ruth G. Strickland, The Language of Elementary School Children: Its Relationship to the Language of Reading Textbooks and the Quality of Reading of Selected Children.

(1) Intonation as related to change of meaning in oral language; e.g., "The boy hit the ball."

"The boy hit the ball!"

"The boy hit the ball?"

How is the meaning changed in relation to intonation?

(2) Intonation as related to change of meaning in written language and how this is related to oral language; e.g.,

The boy hit the ball. (period)

The boy hit the ball! (exclamation)

The boy hit the ball? (question)

How is the meaning changed in relation to punctuation?

(3) Word order and the importance of word order to meaning; e.g., The man hit the ball.

The ball hit the man.

How is the meaning changed in relation to word order?

(4) Word order and the use of common stable elements as related to meaning. Emphasis was placed on characteristics common to words which can occur in the same positions and how these words affect meaning; e.g.,

| | | |
|---|---|---|
| The man | hit | the ball. |
| boy | kicked | bat |
| girl | threw | rock |

How is the meaning changed? What is similar about the use of these words (e.g., man, boy, girl)?

(5) Word order and the use of expanded descriptive elements as related to meaning; e.g.,

The man kicked the ball.

The man kicked the <u>big</u> ball.

The <u>big</u> man kicked the ball.

How is the meaning changed? What else do we know about the <u>ball</u> and the <u>man</u> in the second and third sentences?

(6) Expansion of various types of basic sentence structures through the use of movables as related to meaning.

(a)

| <u>N P</u> | <u>Vi</u> | <u>Adv.</u> |
|---|---|---|
| The boy | ran. | |
| The boy | ran fast. | |
| The boy | ran fast after the dog. | |
| Yesterday the boy | ran fast after the dog. | |

How is the meaning changed? Why?

(b)

| <u>N P</u> | <u>Vt</u> | <u>N P</u> | <u>Adv.</u> |
|---|---|---|---|
| The man | drove | the car. | |
| The man | drove | the car very fast. | |
| The man | drove | the car very fast yesterday. | |

How is the meaning changed? Why?

(c)

| <u>N P</u> | <u>be</u> | <u>Pred.</u> | <u>Adv.</u> |
|---|---|---|---|
| Tom | is | a good boy. | |
| Tom | is | a good boy most of the time. | |

How is the meaning changed? Why?

(d)

| <u>N P</u> | <u>Vc</u> | <u>Comp.</u> | <u>Adv.</u> |
|---|---|---|---|
| Bill | looks | good. | |
| Bill | looks | good | today. |

How is the meaning changed? Why?

(7) Simple transformations were developed for the purpose of building sentence constructions designed to express clear and concise meaning. Examples of several transformations include:

(a) Negative

Sam should do it. Sam should not do it.

(b) Question

Ann has gone. Has Ann gone?

(c) Possessive

He had a cookie. The cookie was delicious.
His cookie was delicious.

(d) Relative Clause

Walter pitched the tent. The tent is on Mr. King's land.

The tent that Walter pitched is on Mr. King's land.

(e) Recursive

Bill hit the ball. Linda hit the ball.

Bill and Linda hit the ball.

(8) Stress was placed on developing an understanding of the relationship of various types of structure word markers to sentence meaning. These included:

(a) noun markers (e.g., the, this, my)

(b) verb markers (e.g., is, was, has)

(c) phrase markers (e.g., in, out, above)

(d) clause markers (e.g., because, if, that)

(e) question markers (e.g., why, how, where)

(9) Other concepts developed in the more advanced plans included:

(a) Subordinative expansion of nominal groups as related to meaning.

(b) Expansion of verbal groups as related to meaning.

(c) Subordinative expansion of clauses as related to meaning.

(d) Discussion of key structure words which affect meaning relationships between sentences.

(10) Lesson plans culminated with special emphasis on the development of problem-solving skills. This aspect of the program took the form of a series of mystery stories presented to the children in written form. Initially the teacher provided guidance in directing the children's attention to various strategic clues leading to a variety of alternatives in solving the mystery. The children then selected their own pertinent clues and examined alternatives which led to the solution of various problems. Many of the early concepts encompassing structural elements which relate to meaning were reviewed and reinforced in the plans.

4. Program P+ : Language structure as related to meaning designed to supplement the McGraw-Hill Reading Series (Program P).

a. All elements in Program P, except the lack of emphasis on language structure as related to meaning, were common to this program.

b. The vocabulary introduced and developed in Program P was used in the materials and exercises in the supplementary aspects of this program. It was considered essential that the children be familiar with the vocabulary in order that emphasis could be focused on the way words function together in conveying meaning.

c. The concepts, exercises, and materials were developed, presented, and utilized in a fashion identical with that in B+. The vocabulary utilized in building the exercises and materials, however, consisted of the words found in Program P.

## Implementation of Instructional Program

All programs involved grouping of a similar nature during the second and the third year. Program B, the Allyn-Bacon reading series,[14] relied on basic reading texts and workbooks which were utilized in ability grouping settings. The grouping was developed around vocabulary presentations, oral reading, and comprehension discussions. A minimum number of four groups were involved in each class, and individual and small group follow-up exercises were developed through the workbook and teacher activity exercises.

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[14] Sheldon, op. cit.

In Program P, the McGraw-Hill programmed materials,[15] ability grouping settings as well as individual and small group activities were utilized. The latter activities were well provided for by the nature of the programmed materials with self-checking information directly available to the pupil. A minimum number of four groups were involved in vocabulary development, oral reading, and comprehension discussions.

Program B+, the Allyn-Bacon reading series supplemented by emphasis on language structure as related to meaning, was developed in a fashion identical with the method used in Program B. The special emphasis on language structure was developed through teacher-directed group discussions and through exercises designed so that the pupils could participate individually and in small groups.

Program P+, the McGraw-Hill materials supplemented by the emphasis on language structure as related to meaning, was developed by the identical method used in Program P. The special emphasis on language structure was also developed through teacher-directed group discussions and through exercises designed for pupil participation both individually and in small groups.

It should be emphasized that the split-group reading plan used in the school district (previously described under "General Plan of Years Two and Three") greatly facilitated grouping and individualization of instruction. By reducing the size of each reading class by approximately one half, much more time could be devoted to the instructional activities in small group settings.

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[15] Buchanan, op. cit.

## Control of Teacher Education Activities

During the second and the third year of the study a series of teacher education activities was developed. Preschool and in-service teacher education workshops were held, and all teachers participating in the study were involved. Two weeks before the opening of school a one and one-half day workshop was conducted. Discussions with all teachers centered about the purposes, objectives, and materials of the study. Teachers in each of the four programs received special instruction on the rationale and methodology of their particular reading program for year two and year three. The materials to be used in each of the programs were discussed and examined in depth by each group of teachers directing the program. Provisions for individual and group activities for children on various ability levels received special emphasis.

An attempt was made to provide similar enrichment emphasis in each of the four reading programs. This was accomplished during the second and the third year by ten in-service teacher workshop discussions related to supplementary reading and language arts activities (five workshops were held each year). A record was kept by the teachers of the children's voluntary reading to provide some insight into the type and quantity of materials read. The classroom visits and observations made by the investigator and his associate throughout the second and third years were valuable in developing consistency in the use of reading and other language arts enrichment activities in each of the programs.

## Instrumentation Utilized

As previously described under "General Plan of Year Two and Three," the following measures and observations were made in obtaining data for the dependent and independent variables of the longitudinal study. The dependent variable measures[16] of decoding skill consisted of:

1. Year two: Word Meaning -- Stanford Achievement Test, Form W, Primary II Battery.

   Year three: Word Meaning -- Stanford Achievement Test, Form X Primary II Battery.

2. Year two: Word Study Skills -- Stanford Achievement Test, Form W, Primary II Battery.

   Year three: Word Study Skills -- Stanford Achievement Test, Form X, Primary II Battery.

3. Years two and three: Regular Word Identification, also known as the Phonetically Regular Words Oral Reading Test (designed by a committee working with the Coordinating Center at the University of Minnesota).

4. Years two and three: Gates Word Pronunciation Test.

The dependent variable measures of comprehension skill consisted of:

1. Year two: Paragraph Meaning Comprehension -- Stanford Achievement Test, Form W, Primary II Battery.

   Year three: Paragraph Meaning Comprehension -- Stanford Achievement Test, Form X, Primary II Battery.

2. Years two and three: Sentence Meaning Comprehension -- Primary Test of Syntax (designed by the investigator).

The independent variable[17] measures relative to the third hypothesis

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[16] A more complete description of each variable may be found in Chapter I, "Dependent Variables Defined."

[17] A more complete description of each variable may be found in Chapter I, "Independent Variables Defined."

of the study, the four exploratory questions, and potential covariates were administered during the first year of the longitudinal study. These consisted of:

1. Morphological Language Development—Berko's Test of Morphology.
2. Syntactical Language Development--Fraser, Bellugi, and Brown's Test of Syntax.
3. Mental Age—Pintner-Cunningham Primary Test of General Ability, Form A.
4. Socioeconomic Status—Minnesota Scale for Paternal Occupations.
5. Chronological Age—School records.
6. Sex—School records.
7. Reading Readiness--Metropolitan Readiness Test, Murphy-Durrell Diagnostic Reading Readiness Test, and the Thurstone Pattern Copying and Identical Forms Test.

## Data Analysis

Each experimental hypothesis was stated in null form for testing. The analysis of covariance was used to test the first two hypotheses of the study. The covariate for each criterion variable consisted of the readiness variable which was found to correlate most highly with the dependent variable under consideration. Since the only comparisons to be examined were those suggested a priori by the research hypotheses, the individual contrasts between treatment means were made regardless of the outcome of the corresponding over-all F-test.[18] Such individual comparisons of the means were made using the F statistic.

The third hypothesis of the study was tested using the Pearson Product Moment Correlation. The four exploratory questions of the study

[18] B. J. Winer, Statistical Principles in Experimental Design, p. 208.

were investigated with the analysis of covariance followed by F-tests between the individual means within each level of the background variables. The use of F-tests in preference to some post hoc procedure was judged desirable not only because such tests are statistically more powerful but also because the comparisons to be made were specified in advance by the researcher.

Ninety-one cases were excluded from the total sample of 415 subjects available for the second year analysis. Because of attrition, only 309 subjects were available for analysis at the end of the third year, and of these, 73 cases were excluded. The majority of the excluded cases, for both the second and the third year, consisted of the subset of subjects having incomplete data on one or more of the dependent variables collected for purposes of this study. A minority of those excluded consisted of the subset of cases randomly deleted in order to make sample sizes equivalent across all treatments. Thus, a sample of 324 subjects (81 per treatment) was used in computing the main effects for the majority of dependent variables at year two, and a sample of 236 subjects (59 per treatment) was used at year three.

For both years two and three, data pertaining to the Regular and Irregular Word Identification variables were collected on a randomly selected subsample of subjects. As with the total sample of subjects, those cases excluded possessed incomplete data, and a few were randomly deleted to equate treatment group sizes. Prior to data analysis for the second year, seventeen cases were removed from the initial subsample of 101, leaving eighty-four cases for computation of main treatment effects. Of the 100 cases available for analysis at year three, eight cases were excluded. Thus ninety-two subjects remained for the analyses.

Calculation of the main treatment effects for both the total sample of subjects and the randomly selected subsample was performed using ANOVA, a computer program featuring analysis of variance and covariance for two- and three-way factoral designs.[19] This program was available from the Computer Center at the University of California, Berkeley.

As previously discussed, the subjects were randomized on the basis of classroom units. It is important to emphasize that within a given school the subjects were not assigned to classrooms on any a priori basis. Following student assignment to the classrooms within a given socioeconomic level of the school community the classroom units were randomly assigned to treatment. This method of randomization as considered under the randomization model discussed by Scheffé provides a rationale for using individual subjects as the unit of analysis with the assumption that the participating schools have equivalent pupil populations.[20]

For the analyses pertinent to the exploratory questions, still further reductions in sample size were sometimes required. Such reductions were necessitated by the restrictions of the ANOVA computer program which was used to perform the three-way analysis of covariance to assess the treatment effects at the various levels of mental age, socioeconomic status, sex, and chronological age. Although the ANOVA program has many desirable features, it has the limitation of requiring the number of

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[19] William W. Cooley and Paul R. Lohnes, Multivariate Procedures for the Behavioral Sciences, pp. 102-114.

[20] Henry Scheffé, The Analysis of Variance, pp. 221-260.

observations per cell to be proportional across rows and across columns. Consequently, sample sizes for the total sample varied between 248 and 308 for the second year analysis, depending upon the background condition under consideration. Within the second-year subsample group, sample sizes ranged between 52 and 76.

Because of the inevitable attrition by year three, the sample size for the exploratory hypotheses was smaller. Sample numbers ranged between 168 and 220 for the analysis of the total sample dependent variables and between 64 and 80 in the analysis of the criterion variables obtained for the subsample group. As a consequence of these small sample size differences, there are occasional small discrepancies between the mean values of the same dependent variable when based on one of these smaller sample sizes as compared with the larger samples used when determining the main treatment effects. These differences, however, are nonsignificant and are accounted for by the chance fluctuations of the mean when based on a sample smaller than the total available number of cases.

# CHAPTER III

## FINDINGS

The two major hypotheses of the study were designed to investigate the effect of the four reading programs varying in (a) the degree of regularity of grapheme-phoneme correspondences, and (b) the emphasis on language structure as related to meaning, on the decoding and comprehension skills of second and third grade children.

The third hypothesis was developed to explore the relationship between reading comprehension achievement and the morphological and syntactical language development of second and third grade children. Four exploratory questions were addressed to the relationship between decoding and comprehension skills variables and the independent variables of mental age, socioeconomic status, sex, and chronological age.

The findings from the data analysis will be presented by contrasting findings within a given year, and relative differences between year two and year three will be discussed. The latter provision should place

achievement variation in perspective over the two-year period. Findings from the first-year study[1] will be reviewed when such information aids the data interpretation. The findings related to the hypotheses and exploratory questions will be summarized and interpreted in Chapter IV. For this reason the discussion in the present chapter will focus for the most part on variation in contrastingly different programs although some interpretation will be noted.

## First Hypothesis--Decoding Skills Development

The first hypothesis of the study stated that second and third grade reading programs possessing a high degree of consistency in grapheme-phoneme correspondences in the vocabulary introduced (Program P, Program P+) will produce significantly higher (a) Word Meaning, (b) Word Study Skills, (c) Regular Word Identification, and (d) Irregular Word Identification achievement scores than will the reading programs making little provision for consistent correspondences (Program B, Program B+). In treating these data, Program P was contrasted with Program B. Likewise the programs utilizing the identical language structure supplement (+), Program B+, Program P+, were placed in contrast. The adjusted dependent variable means for year two and year three are presented in Table 1.

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[1]Robert B. Ruddell, The Effect of Four Programs of Reading Instruction with Varying Emphasis on the Regularity of Grapheme-Phoneme Correspondences and the Relation of Language Structure to Meaning on Achievement in First Grade Reading (1965).

TABLE 1

ADJUSTED MEANS FOR YEARS TWO AND THREE--DECODING SKILLS

| Dependent Variables | Group B | Group P | F Value | Group B+ | Group P+ | F Value | Covariate |
|---|---|---|---|---|---|---|---|
| WORD MEANING | | | | | | | |
| Year 2 | 18.63 (N=81) | 18.16 (N=81) | .22 | 15.80 (N=81) | 19.52** (N=81) | 13.57 | Murphy-Durrell Readiness |
| Year 3 | 24.89 (N=59) | 24.79 (N=59) | .09 | 23.81 (N=59) | 25.53 (N=59) | 2.74 | (in all cases) |
| WORD STUDY SKILLS | | | | | | | |
| Year 2 | 36.78** (N=81) | 31.96 (N=81) | 15.29 | 32.06 (N=81) | 35.54** (N=81) | 3.98 | |
| Year 3 | 42.46 (N=59) | 40.39 (N=59) | .93 | 38.36 (N=59) | 43.38** (N=59) | 5.46 | |
| REGULAR WORD IDENTIFICATION | | | | | | | |
| Year 2 | 26.19 (N=21) | 22.12 (N=21) | 1.09 | 13.98 (N=21) | 24.32** (N=21) | 7.01 | |
| Year 3 | 32.70 (N=23) | 33.99 (N=23) | .19 | 28.26 (N=23) | 34.35** (N=23) | 4.13 | |
| IRREGULAR WORD IDENTIFICATION | | | | | | | |
| Year 2 | 24.38 (N=21) | 23.91 (N=21) | .04 | 18.96 (N=21) | 24.22** (N=21) | 4.74 | |
| Year 3 | 30.59 (N=23) | 29.33 (N=23) | .45 | 27.91 (N=23) | 30.26 (N=23) | 1.55 | |

*Significant at the .01 level.

**Significant at the .05 level.

It is important to realize that because of different test forms the above means can only be compared directly within a given year; however, relative differences may be considered through inspection. The following discussion will consider each variable for years two and three.

Word Meaning.* The findings, as shown graphically in Figure 1, indicate that Program P+ produced significantly higher Word Meaning scores than Program B+ for the second year of the study. No significant difference was found, however, between Program P and Program B. Thus only part of the experimental hypothesis could be confirmed for year two.

*See Tables 14 and 15 in Appendix I for additional information.

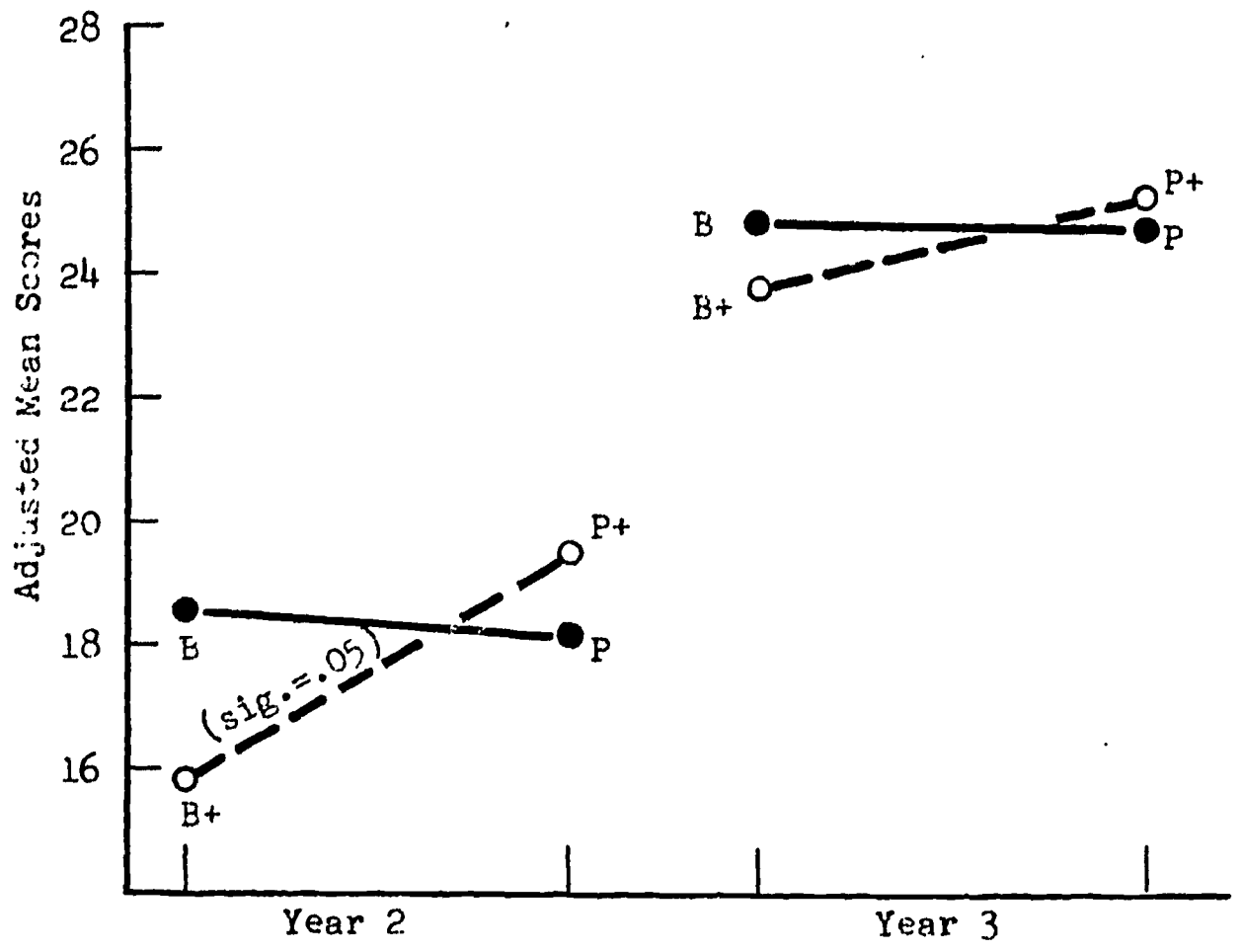


Fig. 1. Adjusted Means for Word Meaning Variable, Years Two and Three

For the third year the P+ treatment produced higher scores than did the B+ treatment; however, this difference was not of sufficient magnitude to reach the required level of significance. No difference was observed between the P and B treatments.

Thus it is noted that at the second year level the P+ treatment produced significantly higher Word Meaning scores than the B+ treatment, paralleling the first year findings, but at the third year these differences decreased to a level which was not significant. The B and P treatment contrasts did not vary significantly for either year two or year three and present a contrasting pattern to year one[2] where treatment P produced significantly higher Word Meaning scores than treatment B.

It was noted that the language structure supplement (+) interacts differently with Program P in the P+ treatment than with Program B in the B+ treatment. This interaction is suggested in the observation of the disproportional means between Program B and Program B+ ($B+ < B$) when compared to Program P and Program P+ means ($P+ > P$). This significant interaction ($F = 8.40$, d.f. 1, 319) for the second year may be due in part to the highly regular vocabulary found in the supplement used with P+, thus providing decoding skill reinforcement which was not present in the irregular correspondences of the B+ supplement. Although the interaction was not significant for year three, an identical pattern emerged.

In conclusion, for the second year of the study the reading program possessing a high degree of consistency in correspondences and placing a special emphasis on language structure as related to meaning (Program

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[2]See Table 14 in Appendix I.

P+) produced significantly higher Word Meaning achievement than did the program utilizing irregular correspondences and placing emphasis on language structure (Program B+). No significant differences were found, however, for the third year, nor were any significant differences found between the program using highly regular correspondences (Program P) and the program utilizing irregular correspondences (Program B) for either year two or year three. A significant interaction for year two indicates that the language structure supplement interacted in a more positive direction with Program P than with Program B.

Word Study Skills.* For the second year of the study the means for treatments P+ and B+, the Word Study Skills scores were found to differ significantly as predicted, favoring the P+ treatment. The B treatment scores, however, were found to be significantly superior to P treatment scores, contrary to the predicted direction. This demonstrates a reversal from the findings at the end of year one. As noted in Figure 2, the difference in B and P treatment means appears to be disproportionately greater than between B+ and P+ treatments, resulting in a significant interaction ($F = 17.03$, d.f. 1, 319) between treatment and the language structure supplement (see Table 16 in Appendix I).

*See Tables 16 and 17 in Appendix I for additional information.

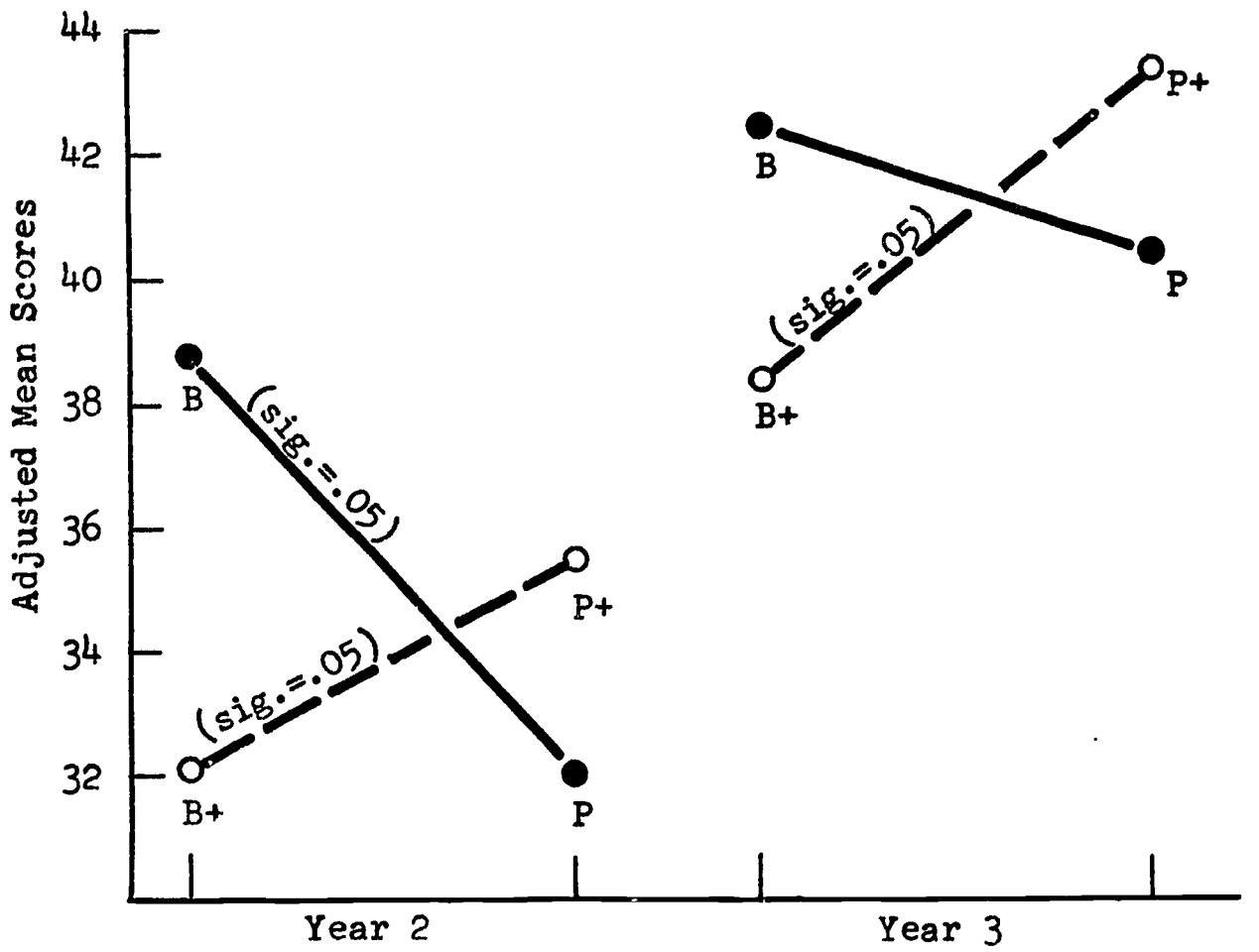


Fig. 2. Adjusted Means for Word Study Skills Variable, Years Two and Three

The mean values at the end of the third year were found to differ significantly between treatments P+ and B+, favoring the former. This predicted pattern is identical with that noted at the end of year two. The B and P treatment contrasts also followed the second year pattern although the differences were not significant. A significant interaction[3] ($F = 5.39$, d.f. 1, 231) was also found between treatment and language structure supplement.

In conclusion, it is noted that during years two and three the program exercising control of correspondences and emphasizing language structure as related to meaning (Program P+) produced significantly superior Word Study Skills achievement than did the program which did not control correspondences but did emphasize language structure (Program B+) as related to meaning. For the second year of the study, however, the program which did not control correspondences (Program B) was found to produce significantly superior Word Study Skills achievement than did the program exercising careful correspondence control (Program P). Although in the third year a similar achievement pattern was found between the program which placed little control on correspondences (Program B) and the program emphasizing correspondence control (Program P), the difference was not of sufficient magnitude to reach significance.

A significant interaction was found for both the second and the third year between the programs and the special language structure supplement. This finding relative to Word Study Skills achievement parallels a similar interaction finding on Word Meaning achievement.

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[3] See Table 17 in Appendix I.

Regular Word Identification.* Achievement variation on the Regular Word Identification variable was found to favor Program P+ significantly in contrast to Program B+ for both the second and third years. No significant variation was found between Program P and Program B for year two or year three; but mean differences favor the latter program for year two and the former for year three. These data are shown in Figure 3.

*See Tables 18 and 19 in Appendix I for additional information.



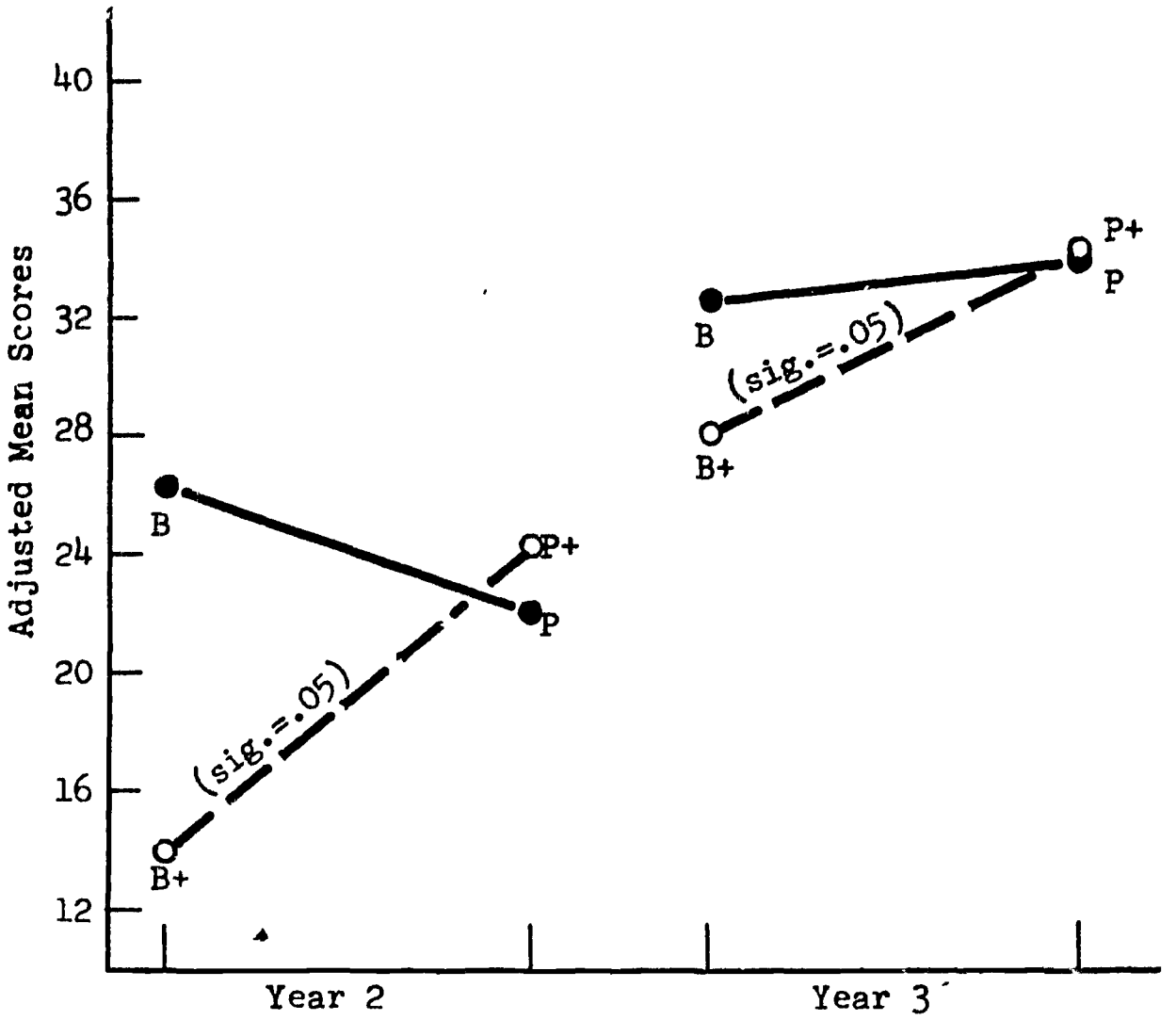


Fig. 3. Adjusted Means for Regular Word Identification Variable, Years Two and Three

Inspection of the above figure reveals that mean differences between Program B and B+ differ markedly from P+ and P mean variation, again suggesting that the supplement (+) has interacted more favorably with Program P than with Program B. A significant interaction[4] ($F = 6.01$, d.f. 1, 79) was found between the language supplement and the basal programs used alone. The third year data reveal that the means from the B and B+ treatments, as well as those from the P and P+ treatments, have moved much closer together. No significant interaction was revealed in the data analysis.

It was concluded that the treatment exercising control over correspondences and language structure (Program P+) produced significantly higher Regular Word Identification achievement during years two and three than did the treatment which emphasized control over language structure alone (Program B+). No significant difference was found between programs varying only in control over correspondences (Program B, Program P). The significant interaction between language structure supplement and programs varying in consistency of correspondences suggests that the supplement aids treatment P to a significantly higher degree than treatment B for the Regular Word Identification variable.

Irregular Word Identification.* The pattern of mean variation for this variable followed that of the Regular Word Identification variable for year two. Treatment P+ produced a significantly higher mean score than did treatment B+. No difference was found between subjects in Program B and Program P. The findings from the third year revealed no significant variation between the programs, nor program interaction, although a nonsignificant trend favors Program P+ over Program B+. These data are presented in Figure 4.

*See Tables 20 and 21 in Appendix I for additional information.

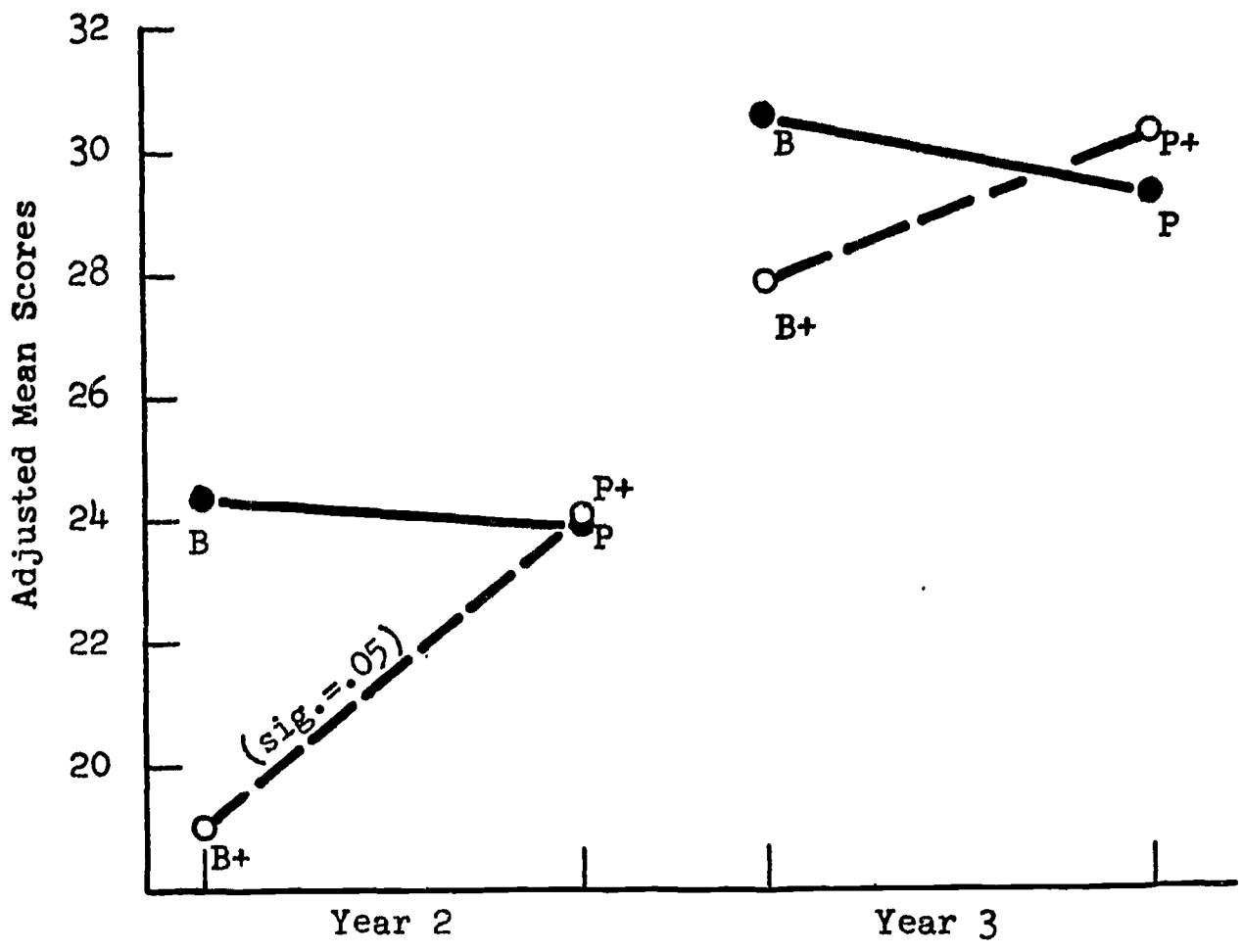


Fig. 4. Adjusted Means for Irregular Word Identification Variable, Years Two and Three

In conclusion, the program controlling correspondences and language structure (Program P+) produced significantly higher Irregular Word Identification achievement for year two than did the program controlling only the language structure (Program B+). No other significant variations were found for year two or year three.

## Second Hypothesis--Comprehension Data

The second hypothesis formulated in the study stated that second and third grade reading programs placing special emphasis on language structure as related to meaning (Program B+, Program P+) will produce significantly higher (a) Paragraph Meaning comprehension, and (b) Sentence Meaning comprehension achievement scores than will reading programs placing no special emphasis on language structure as related to meaning (Program B, Program P). In testing this hypothesis, the means for subjects in Program B were contrasted with the means for subjects in Program B+, and Program P means were contrasted with Program P+ means. The adjusted dependent variable means for the second and third years are found in Table 2.

As was the case for the first hypothesis, the means in Table 2 can be compared only within a given year. Relative differences, however, from year to year, may be considered through inspection.

TABLE 2

ADJUSTED MEANS FOR YEARS TWO AND THREE--COMPREHENSION SKILLS

| Dependent Variables | Group B | Group B+ | F Value | Group P | Group P+ | F Value | Covariate |
|---|---|---|---|---|---|---|---|
| PARAGRAPH MEANING | | | | | | | |
| Year 2 | 31.54** (N=81) | 26.71 (N=81) | 7.93 | 26.93 (N=81) | 31.63** (N=81) | 7.51 | Murphy-Durrell Readiness |
| Year 3 | 40.43 (N=59) | 39.24 (N=59) | .42 | 40.71 (N=59) | 40.78 (N=59) | .01 | (in all cases) |
| SENTENCE MEANING | | | | | | | |
| Year 2 | 44.65 (N=81) | 42.98 (N=81) | .62 | 40.92 (N=81) | 44.06 (N=81) | 2.19 | |
| Year 3 | 53.13 (N=59) | 51.51 (N=59) | .78 | 50.78 (N=59) | 52.75 (N=59) | 1.15 | |

*Significant at the .01 level.

**Significant at the .05 level.

Paragraph Meaning.* The second year findings indicate that Program P+ produced significantly higher Paragraph Meaning comprehension than did Program B+. Although this difference was in the predicted direction, the mean variation between Program B+ and Program B was in the reverse direction, favoring the latter. These data are found in Figure 5.

*See Tables 22 and 23 in Appendix I for additional information.

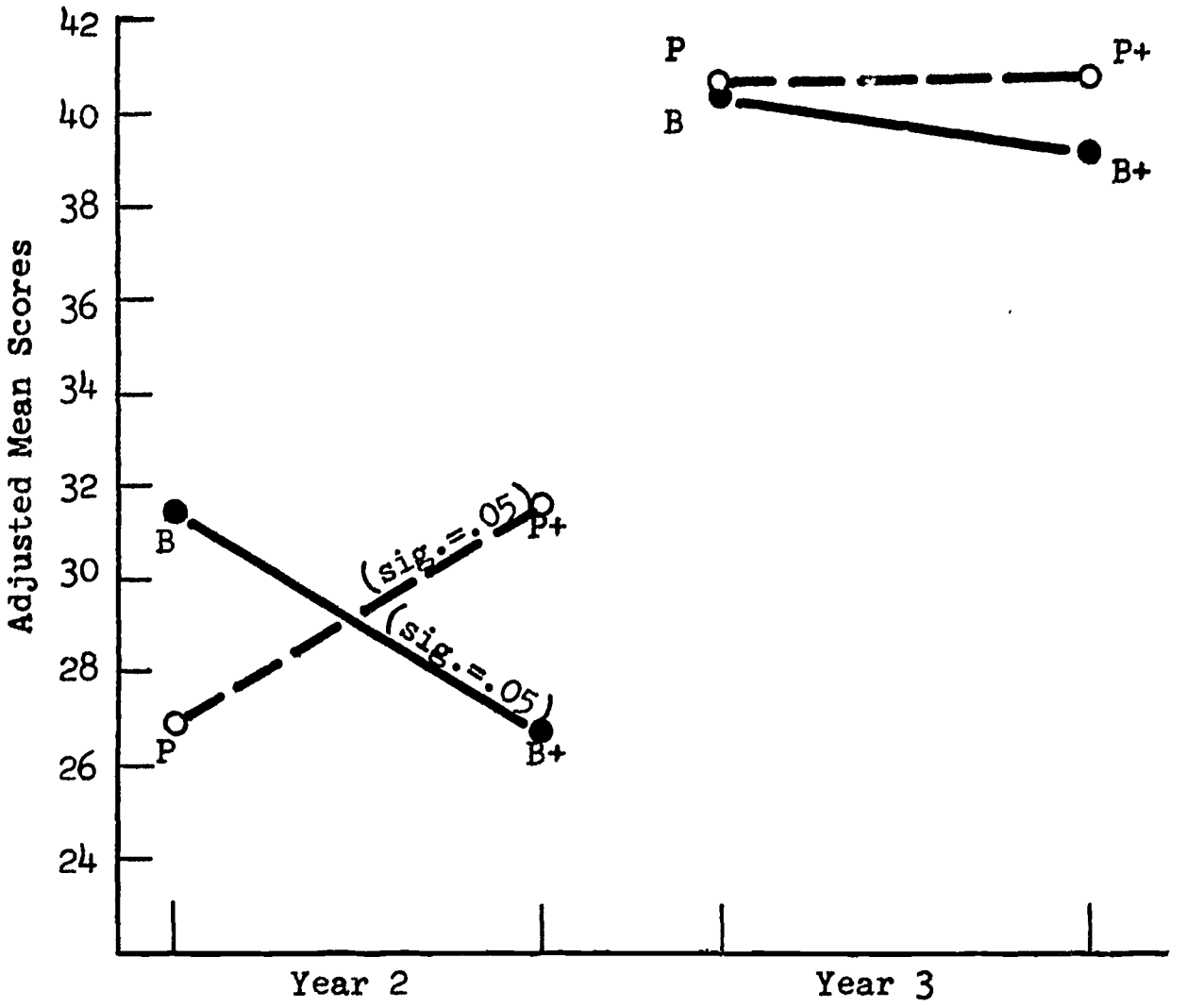


Fig. 5. Adjusted Means for Paragraph Meaning Comprehension Variable, Years Two and Three

No significant differences were found between any contrast for the third year of the study. The pattern of variation for year two and year three reveals that the differences between Programs P and B and between Programs P+ and B+ narrow markedly when contrasted with the second year findings. As suggested by these findings, a significant interaction[5] ($F = 15.04$, d.f. 1, 319) was found. These findings may be interpreted to mean that the subjects at the second year level profited more from using the supplementary program (+) when it was coupled with the P Program in the P+ treatment than when the supplement was combined with Program B in the B+ treatment.

Thus it was concluded that for the second year of the study the program providing for consistency in correspondences and stressing language structure (P+) resulted in significantly higher Paragraph Meaning comprehension than the program providing for consistency and making no special provision for language structure as related to meaning (P). The program which did not control correspondences or emphasize language structure (B) produced significantly higher Paragraph Meaning comprehension than did the parallel program placing no emphasis on correspondence control but emphasizing language structure as related to meaning (B+), a finding which was in reverse of the predicted direction.

Sentence Meaning.* No significant differences were found for any Sentence Meaning comprehension variable contrast for year two or year three. However, the data reported in Figure 6 suggest a trend which is identical with the findings for the Paragraph Meaning variable. The P+ treatment produced a higher mean for years two and three than the P treatment, while the reverse was true for the B+ and B treatment contrasts.

*See Tables 24 and 25 in Appendix I for additional information.

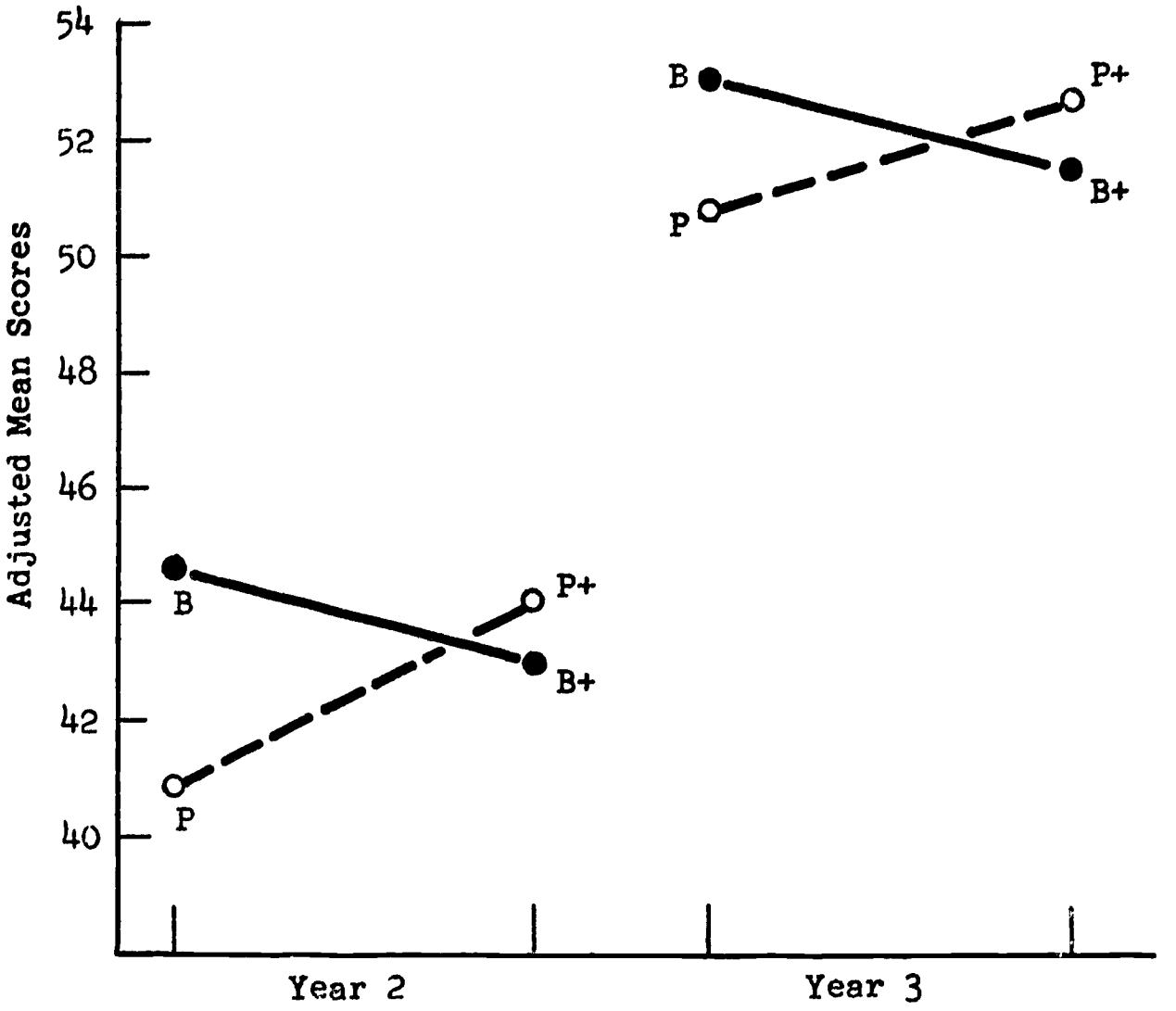


Fig. 6. Adjusted Means for Sentence Meaning Comprehension Variable, Years Two and Three

These findings for the P+ and P treatment contrasts are identical in direction with those of the first year. For the B+ and B treatment contrasts, however, a reverse trend is evident.

The findings at the third year show very little difference in mean values. It is possible that the test ceiling, a raw score of 64, is not sufficient to measure the most advanced children in the P+ and B treatments, and as a result the difference between contrasts for P+ and P and also for B and B+ have been narrowed.

It was concluded that no significant difference was evident for any contrast, although trend directions favored treatment P+ in contrast to treatment P, and treatment B in contrast to treatment B+, for both the second and third years.

## Third Hypothesis--Oral Language and Comprehension Development

The third hypothesis stated that Paragraph Meaning comprehension and Sentence Meaning comprehension at the end of grades two and three are a function of the control which the subjects exhibit over designated aspects of (a) their morphological language system, and (b) their syntactical language system, as measured at the beginning of grade one.

The morphology and syntax instruments were lengthened to provide equivalent forms of each test. Reliability coefficients for the test of morphology and the test of syntax, when corrected by the Spearman-Brown Prophecy Formula, were found to be .95 and .93 respectively. The Primary Test of Syntax, designed by the investigator to measure Sentence Meaning comprehension, was found to have a corrected reliability of .93.

The correlations calculated to test each phase of the third hypothesis for years two and three are presented in the correlation matrix in Table 3.

TABLE 3

CORRELATION COEFFICIENTS BETWEEN PARAGRAPH AND SENTENCE MEANING COMPREHENSION (YEARS TWO AND THREE) AND MORPHOLOGICAL AND SYNTACTICAL LANGUAGE DEVELOPMENT AT THE BEGINNING OF GRADE ONE

| | Year Two (N=89) | | | Year Three (N=71) | | |
|---|---|---|---|---|---|---|
| | Morphology | Syntax | Paragraph Meaning | Morphology | Syntax | Paragraph Meaning |
| Morphology | | | | | | |
| Syntax | .64* | | | .60* | | |
| Paragraph Meaning | .37* | .55* | | .36* | .56* | |
| Sentence Meaning | .42* | .57* | .82* | .38* | .50* | .73* |

*Significant at the .01 level.

The correlation coefficients between the morphology test scores and the second year achievement scores of Paragraph Meaning and Sentence Meaning were found to be .37 and .42 respectively. The third year findings indicate significant correlations between the morphology test and the tests of Paragraph Meaning and Sentence Meaning to be .36 and .38 respectively.

Correlations between the syntax variable and the variables of Paragraph Meaning and Sentence Meaning comprehension were .55 and .57 respectively for year two. Third year findings revealed the correlations

between the variable of syntax and Paragraph and Sentence Meaning comprehension to be .56 and .50 respectively.

These findings suggest that the child's control over designated aspects of his morphological and syntactical language system is significantly related to his Paragraph Meaning and Sentence Meaning comprehension achievement scores. Therefore, the third hypothesis was accepted.

## Exploratory Questions

The four exploratory questions of the investigation examined the relationship between the independent variables of Mental Age, Socioeconomic Status, Sex, and Chronological Age and the subjects' decoding and comprehension skills in the various treatments. The following discussion considers these pertinent data for year two and year three of the study.

Mental Age--Decoding and Comprehension Skills. The first exploratory question asked whether significant differences existed in (a) decoding skills, and (b) comprehension skills between the different reading programs for children within different Mental Age categories. Data relating to the Mental Age of the subjects were obtained from the Pintner-Cunningham Primary Test of General Ability administered at the beginning of the first year of the study. Mental Age scores (reported in months) were used in the classification of subjects for data treatment. The scores for the variables of Word Meaning, Word Study Skills, Paragraph Meaning comprehension, and Sentence Meaning comprehension were classified in the following way for year two data analysis:

| Category | Range of Mental Age Scores | Mental Age in Years and Months |
|---|---|---|
| High | 78-134 | 6:6 - 11:2 |
| Mid | 67-77 | 5:7 - 6:5 |
| Low | 48-66 | 4:0 - 5:6 |

For the analysis at the third year, attrition factors necessitated using slightly different classifications in order to maintain comparable sample sizes across the three levels of Mental Age. These shifts were minor, however, and it is believed that comparable levels of Mental Ability were sampled at years two and three. The categories for the year three analysis were as follows:

| Category | Range of Mental Age Scores | Mental Age in Years and Months |
|---|---|---|
| High | 79-134 | 6:7 - 11:2 |
| Mid | 70-78 | 5:10- 6:6 |
| Low | 48-69 | 4:0 - 5:9 |

The scores for the variables of Regular Word Identification and Irregular Word Identification were categorized in the following ways at years two and three:

| Category | | Range of Mental Age Scores | Mental Age in Years and Months |
|---|---|---|---|
| Year Two: | High | 72-114 | 6:0 - 9:6 |
| | Low | 48-71 | 4:0 - 5:11 |
| Year Three: | High | 73-114 | 6:1 - 9:6 |
| | Low | 50-72 | 4:2 - 6:0 |

These two category classifications were utilized because of the smaller number of subjects for which data were collected on the last two variables.

The year two and year three adjusted means for the Mental Age categories for the decoding variables are presented in Table 4.

TABLE 4

ADJUSTED MEANS FOR YEARS TWO AND THREE DECODING VARIABLES FOR TREATMENT GROUPS B, P, B+, P+, AS CLASSIFIED BY MENTAL AGE

| Year | Mental Age | Group B | Group P | Critical Diff. | Group B+ | Group P+ | Critical Diff. | N/Cell |
|---|---|---|---|---|---|---|---|---|
| WORD MEANING | | | | | | | | |
| 2 | High | 22.04 | 19.19 | 2.10 | 19.39 | 24.63 | 7.11* | 18 |
| 3 | High | 25.00 | 23.70 | .36 | 21.16 | 24.77 | 2.79 | 14 |
| 2 | Mid | 18.36 | 20.02 | .71 | 14.42 | 21.55 | 13.17* | 18 |
| 3 | Mid | 26.09 | 25.55 | .06 | 23.22 | 26.08 | 1.75 | 14 |
| 2 | Low | 15.58 | 15.24 | .03 | 14.10 | 15.37 | .42 | 18 |
| 3 | Low | 22.09 | 21.66 | .04 | 22.09 | 20.45 | .65 | 14 |
| WORD STUDY SKILLS | | | | | | | | |
| 2 | High | 46.38 | 33.46 | 14.14* | 38.69 | 43.22 | 1.74 | 18 |
| 3 | High | 46.25 | 43.73 | .36 | 40.86 | 40.09 | .03 | 14 |
| 2 | Mid | 35.61 | 34.74 | .06 | 30.24 | 39.55 | 7.34* | 18 |
| 3 | Mid | 42.17 | 39.05 | .55 | 36.29 | 46.10 | 5.40** | 14 |
| 2 | Low | 31.49 | 26.64 | 1.99 | 29.55 | 24.87 | 1.86 | 18 |
| 3 | Low | 36.40 | 37.35 | .05 | 27.94 | 38.18 | 5.88** | 14 |
| REGULAR WORD IDENTIFICATION | | | | | | | | |
| 2 | High | 24.17 | 27.78 | .50 | 17.43 | 28.71 | 4.97** | 11 |
| 3 | High | 34.99 | 35.73 | .02 | 28.73 | 38.68 | 4.34** | 9 |
| 2 | Low | 22.30 | 23.33 | .03 | 13.78 | 19.83 | 1.03 | 8 |
| 3 | Low | 26.05 | 32.05 | 1.58 | 24.55 | 33.22 | 3.30 | 9 |
| IRREGULAR WORD IDENTIFICATION | | | | | | | | |
| 2 | High | 24.87 | 26.22 | .17 | 21.47 | 27.90 | 3.94 | 11 |
| 3 | High | 31.31 | 32.37 | .12 | 28.30 | 33.13 | 2.58 | 9 |
| 2 | Low | 21.99 | 24.14 | .32 | 20.10 | 19.63 | .02 | 8 |
| 3 | Low | 27.48 | 25.75 | .33 | 25.39 | 29.38 | 1.76 | 9 |

*Significant at the .01 level. **Significant at the .05 level.

The year two data revealed that the High and Mid Mental Age groups performed significantly better in treatment P+ than in treatment B+ on the Word Meaning variable. No significant differences were found for the Low Mental Age contrast or on any contrast between Program B and Program P. Thus it was concluded that the program emphasizing consistency in correspondences and language structure (P+) produced significantly higher Word Meaning achievement for year two than the program placing no emphasis on correspondence control but emphasizing language structure (B+). It would then appear that the Mid and High Mental Age groups in treatment P+ contributed most to the main effect difference found between treatments P+ and B+ for year two.

Results from the treatment contrasts for the Word Study Skills variable indicate that Program P+ produced significantly higher mean scores than Program B+ for the Mid Mental Age group during year two, and for the Mid and Low Mental Age groups for year three. These groups would appear to have made the greatest contribution to the main effect differences, favoring Program P+ in contrast to Program B+ at year two and year three on the Word Study Skills variable.

A finding which was in reverse of the predicted direction was noted for the High Mental Age group in which Program B was significantly superior to Program P.

These results suggest that the treatment emphasizing control over correspondences and language structure (P+) is more effective for Mid Mental Age subjects for year two, and for Low Mental Age subjects for year two and year three, than the treatment placing no control over correspondences but emphasizing language structure (B+). Conversely,

the High Mental Age group profited most from the treatment which placed no control over correspondences or language structure (B) in contrast to the program which carefully controlled correspondences and did not emphasize language structure (P).

Data related to the Regular Word Identification variable indicate that the High Mental Age group using treatment P+ were significantly superior to subjects using treatment B+ for both year two and year three. No other significant differences were noted; however, the critical differences within the Low Mental Age category approached significance and favored the direction of treatment P+ in contrast to treatment B+, thus suggesting a strong trend. The High Mental Age group would appear to have made the greatest contribution to the main effect differences, favoring treatment P+ at year two, while both High and Low groups contribute to differences at year three.

No significant differences were found on any contrast for the Irregular Word Identification variable at year two or year three. It is noted, however, that the critical difference within the High Mental Age category approached significance and favored the P+ treatment over treatment B+ at year two. The former treatment probably contributed most to the significant main effect favoring treatment P+ in contrast to treatment B+ on the Irregular Word Identification variable.

The adjusted year two and year three means for the comprehension variables are found in Table 5.

TABLE 5

ADJUSTED MEANS FOR YEAR TWO AND YEAR THREE COMPREHENSION VARIABLES FOR TREATMENT GROUPS B, B+, P, P+ AS CLASSIFIED BY MENTAL AGE

| Year | Mental Age | Group B | Group B+ | Critical Diff. | Group P | Group P+ | Critical Diff. | N/ Cell |
|---|---|---|---|---|---|---|---|---|
| PARAGRAPH MEANING COMPREHENSION | | | | | | | | |
| 2 | High | 37.29 | 32.10 | 2.56 | 29.20 | 40.93 | 13.06* | 18 |
| 3 | High | 43.29 | 37.20 | 2.32 | 39.14 | 41.09 | .24 | 14 |
| 2 | Mid | 30.75 | 25.35 | 2.77 | 31.94 | 36.77 | 2.21 | 18 |
| 3 | Mid | 41.03 | 38.40 | .43 | 42.08 | 40.96 | .08 | 14 |
| 2 | Low | 24.35 | 23.84 | .03 | 19.33 | 20.69 | .17 | 18 |
| 3 | Low | 32.85 | 36.93 | 1.07 | 33.88 | 32.74 | .08 | 14 |
| SENTENCE MEANING COMPREHENSION | | | | | | | | |
| 2 | High | 45.38 | 47.55 | .27 | 43.45 | 50.45 | 2.79 | 18 |
| 3 | High | 54.18 | 50.63 | .86 | 51.52 | 50.68 | .05 | 14 |
| 2 | Mid | 48.04 | 41.15 | 2.70 | 49.10 | 50.57 | .12 | 18 |
| 3 | Mid | 55.17 | 51.01 | 1.19 | 53.15 | 55.05 | .25 | 14 |
| 2 | Low | 36.89 | 39.68 | .44 | 30.25 | 31.93 | .16 | 18 |
| 3 | Low | 46.84 | 46.55 | .01 | 49.03 | 46.05 | .61 | 14 |

*Significant at the .01 level.

**Significant at the .05 level.

The data collected at year two reveal a significant difference for the High Mental Age group, favoring subjects in Program P+ in contrast to subjects in Program B+. This was the only significant variation found. It is noted, however, relatively high critical differences were found for second year subjects in the High and Mid Mental Age categories, with mean differences favoring treatment B in contrast to treatment B+. These differences are no doubt reflected in the year two main effect differences favoring treatment P+ in contrast to treatment P, and treatment B in contrast to treatment B+. It would thus appear that the P+ treatment was of significant value to subjects in the High Mental Age category when contrasted with treatment P. The mean trends suggest that treatment B is of greater value to the High and Mid Mental Age subjects for year two than is treatment B+.

The analysis of the Sentence Meaning comprehension variable revealed no significant differences between any of the treatment contrasts within Mental Age categories. Two nonsignificant critical differences, however, were comparatively high. These were first in the High Mental Age category, favoring treatment P+ in contrast to treatment B+, and second in the Mid Mental Age category, favoring treatment B in contrast to treatment B+. Both comparisons were at the year two level and would appear to have contributed heavily to the variation noted in the main effects at year two. These trends suggest that the P+ treatment is of greater value to subjects in the High Mental Age category for year two than is treatment P, while Program B offers greater value to subjects in the Mid Mental Age category than Program B+.

Socioeconomic Status--Decoding and Comprehension Skills. The second exploratory question inquired about significant differences which might exist in (a) decoding skills, and (b) comprehension skills between the different reading programs for children within designated Socioeconomic Status categories. The Minnesota Scale for Paternal Occupations was used to categorize the subjects in terms of Socioeconomic Status. The Word Meaning, Word Study Skills, and Paragraph Meaning comprehension variables were ordered in the following categories for the analyses at the end of both year two and year three.

| Category | Level Identified in Minnesota Scale for Paternal Occupations |
|---|---|
| High | 1, 2, 3 |
| Mid | 4, 5 |
| Low | 6, 7 |

Because of the small number of subjects for which data were available on the Regular Word Identification and Irregular Word Identification variables, the following two categories were utilized for years two and three of the study:

| Category | Level Identified in Minnesota Scale for Paternal Occupations |
|---|---|
| High | 1, 2, 3, 4 |
| Low | 5, 6, 7 |

The data relative to the adjusted means for the decoding variables within Socioeconomic Status categories for year two and year three are presented in Table 6.

TABLE 6

ADJUSTED MEANS FOR YEAR TWO AND YEAR THREE DECODING VARIABLES FOR TREATMENT GROUPS B, P, B+, P+ AS CLASSIFIED BY SOCIOECONOMIC STATUS

| Year | SES | Group B | Group P | Critical Diff. | Group B+ | Group P+ | Critical Diff. | N/Cell |
|---|---|---|---|---|---|---|---|---|
| WORD MEANING | | | | | | | | |
| 2 | High | 19.60 | 18.60 | .31 | 15.94 | 21.54 | 9.52* | 22 |
| 3 | High | 24.19 | 24.86 | .12 | 24.93 | 28.03 | 2.59 | 18 |
| 2 | Mid | 17.05 | 20.02 | 2.68 | 15.33 | 18.57 | 3.18 | 22 |
| 3 | Mid | 24.96 | 26.27 | .46 | 22.73 | 27.43 | 5.95** | 18 |
| 2 | Low | 18.63 | 16.52 | 1.11 | 16.99 | 20.28 | 2.69 | 18 |
| 3 | Low | 25.94 | 20.42 | 4.56** | 23.08 | 23.15 | .00 | 10 |
| WORD STUDY SKILLS | | | | | | | | |
| 2 | High | 39.43 | 30.04 | 8.59* | 32.19 | 40.42 | 6.68** | 22 |
| 3 | High | 45.22 | 43.79 | .14 | 33.90 | 45.78 | 9.85* | 18 |
| 2 | Mid | 36.56 | 34.44 | .44 | 30.10 | 36.12 | 3.57 | 22 |
| 3 | Mid | 42.28 | 46.68 | 1.35 | 37.00 | 44.13 | 3.55 | 18 |
| 2 | Low | 39.47 | 29.45 | 8.10* | 32.09 | 32.91 | .05 | 18 |
| 3 | Low | 39.21 | 38.13 | .05 | 39.79 | 43.95 | .67 | 10 |
| REGULAR WORD IDENTIFICATION | | | | | | | | |
| 2 | High | 29.46 | 27.85 | .04 | 18.37 | 27.77 | 1.29 | 5 |
| 3 | High | 29.14 | 36.28 | 1.19 | 24.86 | 36.54 | 3.18 | 6 |
| 2 | Low | 23.25 | 24.49 | .02 | 15.14 | 16.21 | .02 | 5 |
| 3 | Low | 29.83 | 36.27 | .61 | 24.38 | 39.23 | 8.57* | 10 |
| IRREGULAR WORD IDENTIFICATION | | | | | | | | |
| 2 | High | 28.78 | 27.23 | .10 | 22.21 | 26.81 | .88 | 5 |
| 3 | High | 30.03 | 32.26 | .29 | 25.30 | 32.94 | 3.38 | 6 |
| 2 | Low | 22.77 | 24.31 | .10 | 21.21 | 18.08 | .41 | 5 |
| 3 | Low | 28.65 | 30.46 | .32 | 26.76 | 34.11 | 5.21** | 10 |

*Significant at the .01 level.

**Significant at the .05 level.

On the Word Meaning variable, subjects in the year two High SES category in treatment P+ were found to perform significantly higher than subjects in treatment B+. For the third year of the study a similar significant difference was found, favoring Mid SES subjects in treatment P+. Subjects in the Low SES category for year three were found to perform significantly higher in treatment B than in treatment P. No other significant differences were found, although a comparatively high critical difference was noted, favoring treatment P+ in contrast to treatment B+ for year two Mid SES subjects.

It would therefore appear that for year two subjects in the High and Mid categories and for year three subjecds in the Mid category treatment P+ produces higher Word Meaning achievement than treatment B+. However, Program B would appear to be more effective than Program P for third year subjects in the Low SES category.

The findings relative to the Word Study Skills variable parallel those of the Word Meaning variable in that subjects in the High Socioeconomic Status group for treatment P+ performed significantly better than subjects in treatment B+ for both year two and year three. The critical differences were comparatively high for subjects in the Mid Socioeconomic category for both years, favoring group P+ over group B+, although the differences were not of sufficient magnitude to reach significance.

High and Low Socioeconomic subjects in Program B performed significantly higher than subjects in Program P for year two. This finding was in reverse of that expected. No other significant differences were present.

It is evident that the language structure supplement (+) interacted in a more positive fashion with treatment P+ than with treatment B+.

These findings support the significant interaction findings for the main effects and suggest that Program P+ is more effective with High and Mid Socioeconomic Status subjects than is Program B+ for both second and third year, while treatment B is more effective with High and Low SES subjects than is treatment P for the second year of the study.

Only one significant difference was found for the Regular Word Identification variable. This was present for the Low SES subjects during the third year and favored treatment P+ in contrast to treatment B+. A comparatively high critical difference was noted for the High SES subjects in the third year, favoring treatment P+ in contrast to treatment B+. These findings suggest that treatment P+ is more effective in developing Regular Word Identification at the third year level for Low and High SES subjects than is treatment B+.

Findings for the Irregular Word Identification variable are similar to those for the Regular Word Identification variable. Treatment P+ produced significantly higher Irregular Word Identification achievement than treatment B+ for the Low SES subjects at the third year level, and a similar strong nonsignificant trend is indicated for High SES subjects at the same level. This information again suggests that Program P+ is more effective in developing Irregular Word Recognition achievement than is Program B+ for both Low and High SES subjects. No significant differences were found for the Program P and Program B contrasts.

The adjusted comprehension variable means for year two and year three for various socioeconomic levels are presented in Table 7.

TABLE 7

ADJUSTED MEANS FOR YEAR TWO AND YEAR THREE COMPREHENSION VARIABLES FOR TREATMENT GROUPS B, B+, P, P+ AS CLASSIFIED BY SOCIOECONOMIC STATUS

| Year | SES | Group B | Group B+ | Critical Diff. | Group P | Group P+ | Critical Diff. | N/Cell |
|---|---|---|---|---|---|---|---|---|
| PARAGRAPH MEANING COMPREHENSION | | | | | | | | |
| 2 | High | 31.29 | 25.19 | 3.95** | 28.04 | 35.75 | 6.29** | 22 |
| 3 | High | 39.61 | 40.74 | .11 | 41.87 | 43.67 | ..29 | 18 |
| 2 | Mid | 29.43 | 24.48 | 2.60 | 30.53 | 30.69 | .03 | 22 |
| 3 | Mid | 42.13 | 39.64 | .55 | 43.47 | 44.15 | .04 | 18 |
| 2 | Low | 32.83 | 26.82 | 3.13 | 22.21 | 30.20 | 5.54** | 18 |
| 3 | Low | 40.33 | 37.88 | .29 | 31.74 | 38.86 | 2.48 | 10 |
| SENTENCE MEANING COMPREHENSION | | | | | | | | |
| 2 | High | 43.95 | 40.82 | .63 | 40.85 | 45.82 | 1.59 | 22 |
| 3 | High | 54.03 | 50.83 | 1.13 | 54.30 | 53.55 | .06 | 18 |
| 2 | Mid | 44.95 | 42.16 | .50 | 46.30 | 45.21 | .08 | 22 |
| 3 | Mid | 51.78 | 52.23 | .02 | 54.64 | 56.42 | .35 | 13 |
| 2 | Low | 46.34 | 44.07 | .27 | 34.31 | 42.53 | 3.55 | 18 |
| 3 | Low | 53.14 | 49.71 | .72 | 44.04 | 50.92 | 2.91 | 10 |

*Significant at the .01 level.

**Significant at the .05 level.

Several significant differences were noted for the treatment contrasts on the Paragraph Meaning comprehension variable. Subjects in the second year of the study, and classified in High and Low SES categories, produced significantly higher Paragraph Meaning comprehension in Program P+ than in Program P. A comparatively high insignificant critical value was also noted for the Low SES subjects at year three, favoring the P+ treatment.

Findings which were in reverse of the predicted direction were noted in year two, where the High SES subjects performed significantly better in Program B than in Program B+. A comparatively high nonsignificant critical value was also noted for the Low SES subjects, favoring treatment B. These findings were suggested in the significant main effects interaction between the language structure supplement and the base programs.

Treatment P+ and treatment B would appear to be the most effective programs for year two students in the High and Low SES categories when contrasted with treatments P and B+ respectively. A nonsignificant trend effect was observed, suggesting that treatment P+ produces higher Paragraph Meaning achievement for the third grade students categorized as Low SES students than treatment P.

No significant differences were found on any contrast for the Sentence Meaning comprehension variable. Comparatively high nonsignificant critical values were noted for Low SES students in Program P+ for years two and three when contrasted with Program P. These findings are only suggestive in nature but lend support to the possible value of the language structure supplement in treatment P+ in contrast to treatment P for the Low SES subjects.

Sex--Decoding and Comprehension Skills. The third exploratory question of the study asked: Are there significant differences in (a) decoding skills, and (b) comprehension skills between the different reading treatments for children within male and female categories? Information pertaining to sex was obtained from school records.

The data relative to the decoding variables as categorized by sex are presented in Table 8.

TABLE 8

ADJUSTED MEANS FOR YEAR TWO AND YEAR THREE DECODING VARIABLES FOR TREATMENT GROUPS B, P, B+, P+ AS CLASSIFIED BY SEX

| Year | Sex | Group B | Group P | Critical Diff. | Group B+ | Group P+ | Critical Diff. | N/Cell |
|---|---|---|---|---|---|---|---|---|
| WORD MEANING | | | | | | | | |
| 2 | Male | 19.40 | 18.51 | .39 | 15.99 | 20.00 | 7.96* | 42 |
| 3 | Male | 25.63 | 24.85 | .27 | 24.22 | 25.61 | .84 | 29 |
| 2 | Female | 17.57 | 17.10 | .09 | 15.25 | 18.86 | 5.38** | 35 |
| 3 | Female | 23.98 | 23.17 | .26 | 22.65 | 25.35 | 2.85 | 26 |
| WORD STUDY SKILLS | | | | | | | | |
| 2 | Male | 40.02 | 30.78 | 14.52* | 33.61 | 35.33 | .50 | 42 |
| 3 | Male | 42.84 | 40.29 | .78 | 41.15 | 43.06 | .44 | 29 |
| 2 | Female | 36.88 | 32.38 | 2.87 | 29.67 | 34.80 | 3.74 | 35 |
| 3 | Female | 42.81 | 40.83 | .42 | 34.58 | 43.36 | 8.24* | 26 |
| REGULAR WORD IDENTIFICATION | | | | | | | | |
| 2 | Male | 21.74 | 17.39 | .59 | 28.65 | 11.18 | 9.51* | 10 |
| 3 | Male | 34.97 | 34.26 | .03 | 30.30 | 36.45 | 1.65 | 11 |
| 2 | Female | 26.60 | 20.84 | .93 | 23.19 | 22.95 | .02 | 9 |
| 3 | Female | 27.92 | 32.60 | .78 | 22.33 | 31.29 | 2.87 | 9 |
| IRREGULAR WORD IDENTIFICATION | | | | | | | | |
| 2 | Male | 21.98 | 19.60 | .46 | 26.85 | 18.51 | 5.67** | 10 |
| 3 | Male | 31.98 | 31.39 | .04 | 28.72 | 32.20 | 1.29 | 11 |
| 2 | Female | 25.97 | 21.70 | 1.34 | 23.24 | 22.60 | .01 | 9 |
| 3 | Female | 27.40 | 27.84 | .07 | 25.61 | 28.35 | .65 | 9 |

*Significant at the .01 level.

**Significant at the .05 level.

For the Word Meaning variable only two significant contrasts were found. Both boys and girls at the second year level were found to perform significantly higher in treatment P+ than in treatment B+. A comparatively high nonsignificant critical value was noted for girls at the third year, favoring Program P+ in contrast to Program B+. No significant differences were found between the B and P treatment means. The structural supplement would appear to have interacted differently with treatment P+ than with treatment B+, favoring the former for achievement of both males and females.

The analysis for the Word Study Skills variable revealed that girls in treatment P+ were significantly superior to girls in treatment B+ at the third year level. A high nonsignificant critical value was also observed at year two, favoring girls in the P+ treatment.

Boys at year two were found to perform significantly higher in the B treatment when contrasted with boys in the P treatment, and a similarly nonsignificant trend was evident for girls.

These findings suggest that treatment P+ offers a significant advantage to girls for year two and year three when contrasted with treatment B+, while treatment B produces higher achievement for boys and girls at year two than does treatment P.

An identical pattern of mean differences was observed for both the Regular Word Identification and Irregular Word Identification variables. On both variables, boys at year two produced significantly higher mean values in treatment P+ than in treatment B+. No other significant differences were found. A comparatively high nonsignificant critical value was also observed for girls at the third year level, favoring

Program P+ in contrast to Program B+. These data suggest that treatment P+ produces superior performance for males at year two and year three on Regular and Irregular Word Identification achievement than does treatment B+.

The adjusted means for the comprehension variables as categorized by sex are presented in Table 9.

TABLE 9

ADJUSTED MEANS FOR YEAR TWO AND YEAR THREE COMPREHENSION VARIABLES FOR TREATMENT GROUPS B, B+, P, P+ AS CLASSIFIED BY SEX

| Year | Sex | Group B | Group B+ | Critical Diff. | Group P | Group P+ | Critical Diff. | N/Cell |
|---|---|---|---|---|---|---|---|---|
| PARAGRAPH MEANING COMPREHENSION | | | | | | | | |
| 2 | Male | 31.21 | 27.68 | 2.14 | 26.66 | 32.27 | 5.40** | 42 |
| 3 | Male | 42.14 | 40.93 | .21 | 40.97 | 41.58 | .05 | 29 |
| 2 | Female | 31.40 | 24.03 | 7.77* | 25.91 | 30.58 | 3.12 | 35 |
| 3 | Female | 38.40 | 36.81 | .32 | 38.49 | 39.58 | .15 | 26 |
| SENTENCE MEANING COMPREHENSION | | | | | | | | |
| 2 | Male | 45.05 | 43.25 | .37 | 40.40 | 45.42 | 2.85 | 42 |
| 3 | Male | 54.18 | 53.30 | .11 | 51.62 | 52.52. | .12 | 29 |
| 2 | Female | 43.83 | 42.29 | .22 | 39.37 | 40.84 | .20 | 35 |
| 3 | Female | 51.74 | 48.22 | 1.62 | 49.30 | 53.31 | 2.11 | 26 |

*Significant at the .01 level.

**Significant at the .05 level.

For the Paragraph Meaning comprehension variable, boys in Program P+ at year two were found to possess significantly higher scores than boys in Program P. A similar nonsignificant mean trend is suggested by the comparatively high critical difference favoring treatment P+ over treatment P for girls at the same level.

Girls in treatment B at year two were found to produce significantly higher achievement than girls in treatment B+.

These findings reveal that treatment P+ produces higher Paragraph Meaning comprehension for boys and girls at year two than treatment P, and that treatment B produces higher achievement for girls at year two than treatment B+. Again the structural supplement appears to be interacting more favorably with treatment P+ than with treatment B+.

No significant differences were found on any contrast for the Sentence Meaning comprehension variable. Comparatively high nonsignificant critical values were observed, however, favoring Program P+ over Program P for boys at year two and for girls at year three. These findings can be considered only as trends and suggest that treatment P+ is more effective in producing higher Sentence Meaning comprehension achievement for second grade boys and for third grade girls than is treatment P.

Chronological Age--Decoding and Comprehension Skills. The fourth exploratory question considered significant differences in (a) decoding skills, and (b) comprehension skills achievement between the different reading treatments for children within designated chronological age categories.

The chronological age data collected at the beginning of the first year of the study were used to classify the subjects for data analysis

at the end of year two and year three of the study. Because of differences in sample size between year two and year three, the classifications of subjects into homogeneous chronological age categories show slight variations between the two times. Such discrepancies are very small. Consequently, it is believed that highly comparable ranges of chronological age were sampled for both years reported here. The chronological age data for the variables of Word Meaning, Word Study Skills, Paragraph Meaning, and Sentence Meaning were categorized as follows:

| | Category | Chronological Age Range in Months | Chronological Age Range in Years and Months |
|---|---|---|---|
| Year 2: | High | 78-95 | 6:6 - 7:11 |
| | Mid | 74-77 | 6:2 - 6:5 |
| | Low | 58-73 | 4:8 - 6:1 |
| Year 3: | High | 79-93 | 6:7 - 7:9 |
| | Mid | 75-78 | 6:3 - 6:6 |
| | Low | 58-74 | 4:8 - 6:2 |

Due to the small sample size, the Regular Word Identification and Irregular Word Identification scores were categorized in the following manner for years two and three:

| | Category | Chronological Age Range in Months | Chronological Age Range in Years and Months |
|---|---|---|---|
| Year 2: | High | 76-89 | 6:4 - 7:5 |
| | Low | 70-75 | 5:10- 6:3 |
| Year 3 | High | 76-89 | 6:4 - 7:5 |
| | Low | 68-75 | 5:8 - 6:3 |

The data relative to the decoding variables as classified by the chronological age breakdown are presented in Table 10.

TABLE 10

ADJUSTED MEANS FOR YEAR TWO AND YEAR THREE DECODING VARIABLES FOR TREATMENT GROUPS B, P, B+, P+ AS CLASSIFIED BY CHRONOLOGICAL AGE

| Year | Chron. Age | Group B | Group P | Critical Diff. | Group B+ | Group P+ | Critical Diff. | N/Cell |
|---|---|---|---|---|---|---|---|---|
| WORD MEANING | | | | | | | | |
| 2 | High | 18.34 | 16.60 | .77 | 16.99 | 17.99 | .25 | 19 |
| 3 | High | 24.73 | 21.26 | 2.87 | 22.67 | 26.01 | 2.66 | 14 |
| 2 | Mid | 16.64 | 17.79 | .34 | 14.96 | 18.07 | 2.47 | 19 |
| 3 | Mid | 25.30 | 24.77 | .07 | 25.36 | 27.96 | 1.61 | 14 |
| 2 | Low | 19.53 | 18.68 | .11 | 14.47 | 19.74 | 7.08* | 19 |
| 3 | Low | 24.40 | 25.82 | .48 | 25.97 | 24.39 | .60 | 14 |
| WORD STUDY SKILLS | | | | | | | | |
| 2 | High | 39.54 | 33.61 | 2.90 | 33.12 | 33.58 | .02 | 19 |
| 3 | High | 41.66 | 35.29 | 2.05 | 40.35 | 39.52 | .04 | 14 |
| 2 | Mid | 36.54 | 28.83 | 4.90** | 31.57 | 35.58 | 1.33 | 19 |
| 3 | Mid | 41.78 | 42.78 | .05 | 44.98 | 47.07 | .22 | 14 |
| 2 | Low | 39.64 | 33.19 | 3.43 | 28.73 | 33.39 | 1.79 | 19 |
| 3 | Low | 45.53 | 42.61 | .43 | 36.40 | 43.95 | 3.46 | 14 |
| REGULAR WORD IDENTIFICATION | | | | | | | | |
| 2 | High | 24.03 | 28.40 | .73 | 25.23 | 19.97 | 1.06 | 11 |
| 3 | High | 30.85 | 37.62 | 2.46 | 23.64 | 27.58 | .01 | 10 |
| 2 | Low | 22.21 | 16.88 | .79 | 21.18 | 8.61 | 8.75* | 8 |
| 3 | Low | 28.06 | 37.50 | 4.31** | 32.80 | 38.31 | 1.47 | 9 |
| IRREGULAR WORD IDENTIFICATION | | | | | | | | |
| 2 | High | 23.17 | 26.83 | 1.99 | 24.15 | 21.43 | .68 | 11 |
| 3 | High | 29.69 | 32.92 | 1.15 | 25.68 | 26.46 | .07 | 10 |
| 2 | Low | 21.26 | 21.11 | .01 | 22.29 | 17.56 | 1.50 | 8 |
| 3 | Low | 28.67 | 30.25 | .25 | 29.84 | 31.73 | .35 | 9 |

*Significant at the .01 level.

**Significant at the .05 level.

Only one significant difference was observed on the Word Meaning variable. Low CA subjects in Program P+ at the second year level were found to produce significantly higher achievement than subjects in Program B+. Because of no significant variation between treatments B and P, this finding again suggests that the structure supplement has interacted more favorably with treatment P+ than with treatment B+.

On the Word Study Skills variable, Mid CA subjects in treatment B at the second grade level were found to perform significantly higher than subjects in treatment P. No other significant differences were observed. A comparatively high nonsignificant critical value was noted, favoring low CA third grade subjects in Program P+ when contrasted with those in Program B+.

These findings suggest that treatment B is more effective with Mid CA subjects at grade two than treatment P. Treatment P+ would appear to be more effective for Low CA third grade subjects than for sugjects in treatment B+.

Two significant differences were observed for contrasts on the Regular Word Identification variable. The first difference favored Program B+ for Low CA second grade children in contrast to Program P+. The second difference favored Program P subjects in the Low CA second grade category over subjects in Program B. Both findings were in reverse of all significant directions and trends and may have been due to chance variation resulting from comparatively small sample size.

No significant variation was observed on the Irregular Word Identification variable, nor were any nonsignificant critical values of sufficient magnitude to suggest any potential trend.

The adjusted mean values for the dependent variables on comprehension as categorized by chronological age levels are found in Table 11.

TABLE 11

ADJUSTED MEANS FOR YEAR TWO AND YEAR THREE COMPREHENSION VARIABLES FOR TREATMENT GROUPS B, B+, P, P+ AS CLASSIFIED BY CHRONOLOGICAL AGE

| Year | Chron. Age | Group B | Group B+ | Critical Diff. | Group P | Group P+ | Critical Diff. | N/Cell |
|---|---|---|---|---|---|---|---|---|
| PARAGRAPH MEANING COMPREHENSION | | | | | | | | |
| 2 | High | 29.88 | 28.57 | .15 | 24.65 | 27.41 | .66 | 19 |
| 3 | High | 39.58 | 40.33 | .04 | 32.55 | 39.44 | 3.72 | 14 |
| 2 | Mid | 30.47 | 25.50 | 2.15 | 25.70 | 30.62 | 2.11 | 19 |
| 3 | Mid | 43.12 | 43.61 | .02 | 41.81 | 44.03 | .39 | 14 |
| 2 | Low | 31.43 | 25.83 | 2.73 | 28.85 | 32.10 | .92 | 19 |
| 3 | Low | 40.64 | 42.73 | .34 | 43.19 | 39.76 | .92 | 14 |
| SENTENCE MEANING COMPREHENSION | | | | | | | | |
| 2 | High | 41.59 | 45.93 | 1.02 | 40.63 | 40.78 | .01 | 19 |
| 3 | High | 54.73 | 50.65 | 1.24 | 44.20 | 51.30 | 3.75 | 14 |
| 2 | Mid | 44.73 | 43.09 | .15 | 40.50 | 42.47 | .21 | 19 |
| 3 | Mid | 53.54 | 56.24 | .54 | 51.17 | 55.51 | 1.40 | 14 |
| 2 | Low | 47.18 | 39.41 | 3.27 | 43.61 | 47.14 | .68 | 19 |
| 3 | Low | 53.83 | 53.01 | .05 | 53.57 | 50.81 | .57 | 14 |

*Significant at the .01 level.

**Significant at the .05 level.

No significant variation on the Paragraph Meaning and Sentence Meaning comprehension variables was found between any treatment within the Chronological Age categories for second and third grade. A comparatively high nonsignificant critical value, however, was noted for the Paragraph Meaning variable, favoring treatment P+ for High CA third grade subjects in contrast to subjects in Program P. On the Sentence Meaning variable a comparatively high critical value was also noted for the same category, favoring treatment P+ over treatment P. The only other comparatively high nonsignificant critical value worthy of note favored treatment B over treatment B+ on the Sentence Meaning comprehension variable for subjects categorized as Low CA second graders.

These comparatively high nonsignificant critical values suggest that Program P+ produces higher Paragraph Meaning and Sentence Meaning comprehension achievement for High CA third grade subjects than does Program P. Treatment B appears to produce higher Sentence Meaning comprehension achievement for Low CA second grade subjects than does treatment B+.

# CHAPTER IV

## CONCLUSIONS, IMPLICATIONS, AND RECOMMENDED RESEARCH

The primary objective in the second and the third year of the study was to investigate the effect on decoding and comprehension skills of four reading programs varying in (a) the degree of regularity of grapheme-phoneme correspondences programmed into the vocabulary presented, and (b) the emphasis on language structure as related to meaning. The secondary objective of the investigation was to examine the relationship between the subjects' morphological and syntactical language development in grade one and their comprehension achievement in grade three.

Four exploratory questions were developed to study the relationship between the independent background variables of mental age, socioeconomic status, sex, and chronological age, and the dependent decoding and comprehension variables. In each case this relationship was considered relative to the contrastingly different reading programs employed.

## Design of the Investigation

The two published programs which had been selected at the outset of the first-year study were continued throughout the second and third years. The development of the two supplementary reading programs was also continued into the second and the third year of the investigation. These programs were selected and developed in order to provide the characteristics believed essential for testing the experimental hypotheses.

Program B consisted of a basal reading series[1] which was one of two basal programs available for use in the Oakland Unified School District. This series was selected for use in Program B and Program B+ because it had received no use by most teachers and only minimal use by a few second and third grade teachers. This program made little attempt to control the grapheme-phoneme regularities in the vocabulary presented. Workbooks were provided for this program by the research project.

Reading Program P consisted of a basal reader series[2] and offered detailed control of grapheme-phoneme correspondences presented in the vocabulary. This program was developed in a programmed format and was provided by the research project.

The supplementary aspects (+)[3] of Programs B+ and P+ were developed by the investigator. These two supplementary aspects were identical in

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[1]William D. Sheldon and others, Sheldon Basic Reading Series (New York: Allyn and Bacon, Inc., 1957).

[2]Cynthia Dee Buchanan, Programmed Reading (New York: McGraw-Hill Book Co., Inc., 1963).

[3]See discussion in Chapter II and sample lesson plans in Appendix B.

nature, but differed in the vocabulary used, which was drawn from Program B and Program P respectively. The supplements emphasized meaning contrasts within basic patterns of language structure through word substitution, pattern expansion and elaboration, pattern inversions, and pattern transformations. The importance of noun, verb, phrase, clause, and question markers in relation to meaning change was also emphasized. Detailed teacher plans were designed for each lesson. Words for pattern construction and manipulation were grouped on the basis of form class and printed on color-coded 1-1/4 inch wooden cubes to provide flexibility in pattern construction in developing the desired contrasting meaning changes.

Under the rotating grade plan used widely in the Oakland Unified School District, Oakland, California, the twenty-four randomly assigned teachers from the first grade study followed their classes into the second grade. Thus the random assignment of teachers to treatment groups effected at grade one in September 1964 automatically provided for randomization of teachers to treatment groups at the second grade level. In the third year of the study the second grade pupils progressed into the third grade classroom taught by the teacher who would normally receive that class. All third grade teachers were new to the study. During the second and the third year, one class was lost from each treatment group. Three of these (B, P, B+) were from the lowest income area of the district, and one class (P+) was from the middle income area.

All reading programs were used for the first time by the great majority of the second and third grade teachers. An initial workshop was held at the beginning of the second grade and third grade school years.

The one-and-one-half-day workshops were held to familiarize the teachers with the basic instructional rationale and the instructional methodology, and to provide an overview of the research project design. Five teacher workshops were held during each of the consecutive years. Throughout the experiment, teacher visitation was carefully equated for the various treatments. Every effort was made to insure equivalent teacher interest and enthusiasm in controlling for differences which might have been produced by the "Hawthorne effect."

Variation in time devoted to reading instruction was controlled for each treatment group. Throughout each week the first group of subjects in Program B and Program P devoted 60 minutes in the morning to reading; the second group in each program devoted 60 minutes in the afternoon to the same activity. Both programs thus used the split-group plan[4] common to the school district. The first group of subjects in Program B+ and Program P+ also followed the split-group plan. On Monday, Wednesday, and Friday the latter two treatments devoted 45 minutes to basal reading in the split periods and 15 minutes to the supplementary program, emphasizing language structure as related to meaning. On the remaining days of each week, subjects in treatments B+ and P+ followed the instructional time plan used for the subjects in treatments B and P.

Criterion tests were administered in May of 1966 and May of 1967 to evaluate second- and third-year reading achievement relative to the hypotheses of the study. These tests included the following: Word Meaning,

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[4]Under the split-group reading plan the first group of pupils in a given class arrives at 8:45 A.M. and reading is taught until 9:45. At 9:45 the second group of pupils joins the class. At 2:00 P.M. the pupils who entered school at 8:45 leave the class, and the pupils who entered school at 9:45 have reading instruction until 3:00.

Word Study Skills, and Paragraph Meaning subtests of the Stanford Achievement Test; Primary Test of Syntax, designed by the investigator to measure Sentence Meaning comprehension; Phonetically Regular Words Oral Reading Test, designed by the University of Minnesota Coordinating Research Center to measure children's ability to decode words containing consistent correspondences; and Gates Word Pronunciation Test, administered to measure children's ability to decode words containing inconsistent correspondences. The two latter tests were administered individually to a randomly selected group of children drawn from each treatment group.

Also administered at the outset of the first grade study were modified forms of Berko's Test of Morphology and the Fraser, Bellugi, and Brown Test of Syntax. These tests were administered individually to 160 randomly selected children (40 subjects from each treatment group) and were used in measuring the subjects' control over specific aspects of their morphological and syntactical language systems relative to the secondary objective of the study.

The analysis of covariance followed by F tests between individual means was used to test the first two hypotheses, encompassing the primary objective of the study, and also in the analysis of the exploratory questions. The covariate for each criterion variable consisted of the first grade readiness variable which was found to correlate most highly with the dependent variable under consideration. The covariate in each case was the Murphy-Durrell Diagnostic Reading Readiness Test. The third hypothesis relative to the secondary objective of the study was tested, using the Pearson Product-Moment Correlation.

## Findings and Discussion

The discussion of the investigation findings is based on year two and year three of the longitudinal study. On occasion first-year findings have been incorporated into the discussion in order to establish similar or contrasting achievement differences over the three-year period. The discussion of the findings relative to the exploratory questions have been placed directly after each major hypothesis of the study in the attempt to interpret the findings in a more meaningful manner.

Concern has been given not only to significant variation between treatments but also to practical significance for educational practice. For the latter reason, grade equivalents have been used in the two summary tables when this conversion information was available (Word Study Skills, Word Meaning, and Paragraph Meaning). In the absence of grade equivalent information raw scores are summarized for other variables (Regular Word Identification, Irregular Word Identification, and Sentence Meaning). Several nonsignificant differences have been reported in the summary tables. Although the investigator was reluctant to report such information, he felt there was justification for the purposes of suggesting trend patterns with instructional implications and, more importantly, in providing direction for future research. Thus all comparatively high F values which approached significance have been identified as such and incorporated in the summary discussion.

Hierarchy of Variables

As one approaches the data of the study in the attempt to develop meaningful interpretation, the relationship between the six dependent variables and the reading act should be considered. As a task analysis of the decoding variables of Word Meaning, Word Study Skills, Regular Word Identification, Irregular Word Identification, Sentence Meaning, and Paragraph Meaning comprehension is considered, a logical ordering emerges.

Performance on the Word Study Skills variable requires the child to match an auditory stimulus with a visual component in word beginnings and word endings. Another dimension of this variable asks the subject to identify the identical phoneme or phonemes which may be represented by a different grapheme or graphemes. The type of behavior required in this type of item would suggest that this task is basic to the decoding act, and that if the subject is to perform successfully on the other decoding variables, success would be initially required on the Word Study Skills variable.

The Regular Word Identification and Irregular Word Identification variables both require the subject to pronounce a list of words which vary in the degree of control over the regularity of sound-letter correspondences. That is, the child is asked to translate the printed word into its oral counterpart. Performance on these two tasks would seem to be a requisite for performance on the Word Meaning variable. This latter task requires the child to read a sentence and to select one correct word from four alternatives to complete the sentence. Thus it is not only necessary for the child to decode the words but he must also understand each word and its relationship to other words in order to select the correct response.

In turn, one might expect successful performance on each of the four decoding variables to be a necessary requisite for achievement on the Sentence Meaning and Paragraph Meaning comprehension variables. Consequently, once the child has converted the printed symbols into their oral counterparts, the higher thinking processes must be mobilized in manipulating and interpreting the symbols to comprehend the intended message. This assumes, of course, that the child possesses the necessary competencies to comprehend the message. The Sentence Meaning comprehension task measures the child's ability to match sentences varying in meaning based on a grammatical contrast, with appropriate pictures depicting the contrasts. This ability would be expected to be basic to understanding larger meaning-bearing units such as paragraphs.

The Paragraph Meaning comprehension task requires the subject to select one of four possible words to complete accurately the meaning of a sentence. More than one word may be deleted in a given paragraph, or words may be deleted from a group of sentences designed to measure information obtained in reading the paragraph. Success with this task would require competence in decoding and Sentence Meaning comprehension, and also would require relating key points of information across running discourse.

The decoding and comprehension skills would thus be expected to possess necessary but not necessarily sufficient dependencies in the following order:

1. Decoding Skills

    a. Word Study
    b. Regular Word Identification
    c. Irregular Word Identification
    d. Word Meaning

2. Comprehension Skills

   a. Sentence Meaning
   b. Paragraph Meaning

This same order will be followed in examining the findings of the study.

First Hypothesis--Decoding Skills

In the following discussion the findings relative to each hypothesized main effect for year two and year three are reviewed. The related exploratory questions are also considered. These data are summarized in Table 12.

TABLE 12

SUMMARY OF MAIN EFFECTS AND EXPLORATORY QUESTIONS FOR DECODING VARIABLES
YEAR TWO AND YEAR THREE

| Independent Variable Categories | Dependent Variables: Word Study Skills (Grade Equivalents) Year 2 B | Word Study Skills (Grade Equivalents) Year 2 P | Word Study Skills (Grade Equivalents) Year 3 B | Word Study Skills (Grade Equivalents) Year 3 P | Regular Word Identification (Raw Scores) Year 2 B | Regular Word Identification (Raw Scores) Year 2 P | Regular Word Identification (Raw Scores) Year 3 B | Regular Word Identification (Raw Scores) Year 3 P | Irregular Word Identification (Raw Scores) Year 2 B | Irregular Word Identification (Raw Scores) Year 2 P | Irregular Word Identification (Raw Scores) Year 3 B | Irregular Word Identification (Raw Scores) Year 3 P | Word Meaning (Grade Equivalents) Year 2 B | Word Meaning (Grade Equivalents) Year 2 P | Word Meaning (Grade Equivalents) Year 3 B | Word Meaning (Grade Equivalents) Year 3 P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Main Effects | 3.1** | 2.4 | | | | | | | | | | | | | | |
| High M.A. | 4.0* | 2.5 | | | | | | | | | | | | | | |
| High SES | 3.1* | 2.3 | | | | | | | | | | | | | | |
| High CA | | | | | | | | | | | | | | | | |
| Mid M.A. | | | | | | | | | | | | | | | | |
| Mid SES | | | | | | | | | | | | | | | | |
| Mid CA | 2.9* | 2.2 | | | | | | | | | | | | | | |
| Low M.A. | | | | | | | | | | | | | | | | |
| Low SES | 3.1* | 2.2 | | | | | | | | | | | | | 3.7** | 3.0 |
| Low CA | | | | | | | 28.1 | 37.5** | | | | | | | | |
| Male | 3.3* | 2.4 | | | | | | | | | | | | | | |
| Female | | | | | | | | | | | | | | | | |

*Significant at the .01 level.
**Significant at the .05 level.

TABLE 12 (cont.)

| Independent Variable Categories | Dependent Variables: Word Study Skills (Grade Equivalents) Year 2 B+ | Year 2 P+ | Year 3 B+ | Year 3 P+ | Regular Word Identification (Raw Scores) Year 2 B+ | Year 2 P+ | Year 3 B+ | Year 3 P+ | Irregular Word Identification (Raw Scores) Year 2 B+ | Year 2 P+ | Year 3 B+ | Year 3 P+ | Word Meaning (Grade Equivalents) Year 2 B+ | Year 2 P+ | Year 3 B+ | Year 3 P+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Main Effects | 2.4 | 2.8** | 3.0 | 3.6** | 14.0 | 24.3** | 28.3 | 34.4** | 19.0 | 24.2** | | | 2.7 | 3.0** | | |
| High M.A. | | | | | 17.4 | 28.7** | 28.7 | 38.7** | 21.5 | 27.9 | 28.3 | 33.1 | 2.9 | 3.6* | | |
| High SES | 2.4 | 3.3** | 2.8 | 4.0* | | | 24.9 | 36.5 | | | 25.3 | 32.9 | 2.7 | 3.2* | | |
| High CA | | | | | | | | | | | | | 2.6 | 3.0* | | |
| Mid M.A. | 2.3 | 3.3* | 2.8 | 4.0** | | | | | | | | | 2.5 | 3.2* | | |
| Mid SES | 2.3 | 2.8 | 3.0 | 3.7 | | | | | | | | | 2.6 | 2.9 | 3.5 | 4.0** |
| Mid CA | | | | | | | | | | | | | | | | |
| Low M.A. | | | 2.1 | 3.0** | | | 24.6 | 33.2 | | | | | | | | |
| Low SES | | | | | | | 24.4 | 39.2* | | | 26.8 | 34.1** | | | | |
| Low CA | | | 2.9 | 3.7 | 21.2* | 8.6 | | | | | | | | | | |
| Male | | | | | 28.7* | 11.2 | | | 26.9** | 18.5 | | | 2.7 | 3.0* | | |
| Female | 2.3 | 2.7 | 2.8 | 3.6* | | | | | | | | | 2.6 | 2.9** | 3.5 | 3.7 |

*Significant at the .01 level.

**Significant at the .05 level.

(Covariate - Murphy-Durrell Diagnostic Reading Readiness Test)

Note: The Regular Word Identification and Irregular Word Identification variables do not have information available for converting raw scores to grade equivalents. Thus raw scores have been reported to the nearest tenth.

Main Effects. The first hypothesis of the study predicted that for year two and year three, treatments P and P+, containing carefully controlled correspondences, would produce significantly higher Word Study Skills, Regular Word Identification, Irregular Word Identification, and Word Meaning achievement than treatments B and B+ respectively.

The main effect findings for year two and year three revealed that treatment P+ did produce significantly higher Word Study Skills, Regular Word Identification, Irregular Word Identification, and Word Meaning achievement than did treatment B+, except for the third year where no difference was noted on the Irregular Word Identification and Word Meaning variables. These differences would appear to be of practical significance at year two, accounting for a .4 and .3 year gain on the Word Study Skills and Word Meaning variables respectively, favoring treatment P+ over treatment B+. A .4 year gain was also evident at year three on the Word Study Skills variable, favoring the P+ treatment.

No significant contrasts in the predicted direction were found, however, on the contrasts between treatment P and treatment B.

A significant difference was present but in reverse of the predicted direction, favoring treatment B over treatment P on the Word Study Skills variable at the second year. This difference was also of practical significance at year two and favored treatment B over treatment B+ with a .7 year gain.

Significant interactions were observed between basal programs and the structural supplement on the Word Study Skills, Regular Word Identification, and Word Meaning variables for year two, and for the former two variables for year three. These interactions suggest that the language structure

supplement (+) interacted more favorably with treatment P+ than with treatment B+. Although the language structure supplements (+) for treatment P+ and treatment B+ developed identical meaning and structural concepts, the vocabulary utilized in each differed by approximately 50 per cent. This difference was due to vocabulary, which was drawn uniquely from Program P and Program B respectively. Closer examination of the vocabulary reveals, as would be expected, that vocabulary correspondences used in the supplement (+) for the P+ treatment is more consistent than vocabulary correspondences used in the B+ treatment. It is possible that the more consistent correspondences contained in the supplement (+) of the P+ treatment could have reinforced the decoding skills to a higher degree than in the supplement (+) of the B+ treatment and thus produced significantly higher decoding achievement. This speculation should be pursued in future research.

Exploratory Questions. The initial part of each exploratory question of the study inquired about significant differences at year two and year three which might exist in decoding skills between the different reading programs for children within designated levels of mental age, socioeconomic status, chronological age, and sex categories.

Exploratory Question: Word Study Skills. At year two and year three, treatment P+ produced significantly higher Word Study Skills achievement than treatment B+ for subjects classified as High Socioeconomic Status and Mid Mental Age. These differences would also appear to be of practical significance, differing at year two by .9 of a year and one year respectively, and at year three by 1.2 years for both variables.

Additionally at year three the subjects in treatment P+ were significantly superior to those in treatment B+ when classified in the Low Mental Age and Female categories. The practical magnitude of these differences was .9 and .8 of a year respectively.

High nonsignificant F values also suggest trends favoring treatment P+ over treatment B+ for the subjects classified in the Mid Socioeconomic level for year two (.5 year) and year three (.7 year), for Females at year two (.4 year), and for the Low Chronological Age group (.8 year) at year three.

Significant findings in reverse of the predicted direction were found at year two, favoring treatment B over treatment P for the following subject categories: High Mental Age, High and Low Socioeconomic Status, Mid Chronological Age, and Males. These differences appear also to be of practical significance, varying 1.5 years, .8 year, .9 year, .7 year, and .9 year respectively. Because of the comparatively low F values, no trends could be identified.

Exploratory Question: Regular Word Identification. The significant differences on the word identification variable again favored treatment P+ over treatment B+ for the second and third years for High Mental Age subjects and for the third year only for the Low Socioeconomic Status subjects. The comparatively large difference in number of words correctly decoded by the P+ treatment over the B+ treatment suggests that this finding is also of practical significance.

At the second year level, treatment B+ was found to produce significantly higher mean differences than treatment P+ for subjects classified as Low Chronological Age, and Male. These differences were also large

and would appear to hold practical significance.

The contrast between treatment B and treatment P for the Regular Word Identification variable revealed only one significant difference, favoring treatment P. This was at the third year level for Low Chronological Age subjects. No trends were evident in the data.

The significant differences for the Low Chronological Age subjects, favoring treatments B+ and P over treatments P+ and B respectively, are in reverse of all other findings and trends in the study. Therefore the investigator suggests that these findings, although statistically significant, should be viewed with caution and may be a result of chance variation due to a comparatively small sample size.

Exploratory Question: Irregular Word Identification. At the second year level one significant difference was identified for the Irregular Word Identification variable, favoring treatment B+ over treatment P+ for boys. This difference was in reverse of the predicted direction. For year three a significant difference was found favoring treatment P+ over treatment B+ for subjects classified in the Low Socioeconomic Status category. Both mean differences were of sufficient magnitude to suggest practical significance.

Comparatively high nonsignificant F values suggest two trends favoring treatment P+ over treatment B+ for subjects classified as High Mental Age at year two and year three and for subjects in the High Socioeconomic Status category at year three. These trends are consonant with significant differences and trends identified for the Regular Word Identification variable.

No significant differences or trends were identified for the treatment B and treatment P contrasts at year two or year three on the

Irregular Word Identification variable.

Exploratory Question: Word Meaning. On the Word Meaning variable at year two, significant differences were present, favoring treatment P+ over treatment B+ for children classified in the following categories: High and Mid Mental Age, High Socioeconomic Status, High Chronological Age, Male and Female. The differences range from .3 to .7 of a year and would appear to be of practical significance.

At the third year only one significant difference was evident. Treatment P+ produced significantly superior achievement when contrasted with treatment B+ for children classified in the Mid Socioeconomic category. This represented a .5 year difference. A nonsignificant trend was suggested at year two for the Mid Socioeconomic group, favoring treatment P+ (.3 year). A second trend was noted at year three, favoring treatment P+ over treatment B+ for subjects in the Female category (.2 year).

Only one significant difference was revealed for the contrast between treatment B and treatment P. This was at year three for children classified in the Low Socioeconomic category and favored treatment B over treatment P. The difference would appear to be of practical significance, representing .7 of a year. No F values were of significant magnitude to suggest other possible trends.

## Second Hypothesis--Comprehension Skills

The summary of data related to the comprehension variables and exploratory questions is presented in Table 13. The major comprehension hypothesis will be considered, followed by a discussion of the exploratory questions.

TABLE 13

SUMMARY OF MAIN EFFECTS AND EXPLORATORY QUESTIONS FOR COMPREHENSION VARIABLES, YEAR TWO AND YEAR THREE

| Independent Variable Categories | Dependent Variables: Sentence Meaning (Raw Scores) Year 2 B | B+ | Year 3 B | B+ | Paragraph Meaning (Grade Equivalents) Year 2 B | B+ | Year 3 B | B+ | Sentence Meaning (Raw Scores) Year 2 P | P+ | Year 3 P | P+ | Paragraph Meaning (Grade Equivalents) Year 2 P | P+ | Year 3 P | P+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Main Effects | | | | | 2.9* | 2.6 | | | 41.0 | 44.1 | | | 2.6 | 2.9* | | |
| High MA | | | | | 3.2 | 2.9 | 3.7 | 3.2 | 43.5 | 50.5 | | | 2.7 | 3.6* | | |
| High SES | | | | | 2.9** | 2.5 | | | | | | | 2.6 | 3.1** | | |
| High CA | | | | | | | | | | | 44.2 | 51.3 | | | 3.0 | 3.3 |
| Mid MA | | | | | 2.8 | 2.5 | | | | | | | | | | |
| Mid SES | | | | | | | | | | | | | | | | |
| Mid CA | | | | | | | | | | | | | | | | |
| Low MA | | | | | | | | | | | | | | | | |
| Low SES | | | | | | | | | 34.3 | 42.5 | 44.0 | 50.9 | 2.3 | 2.8** | 2.9 | 3.3 |
| Low CA | 47.2 | 39.4 | | | | | | | | | | | | | | |
| Male | | | | | | | | | 40.4 | 45.4 | | | 2.5 | 2.9** | | |
| Female | | | | | 2.9* | 2.4 | | | | | 49.3 | 53.3 | 2.5 | 2.8 | | |

*Significant at the .01 level.

**Significant at the .05 level.

(Covariate - Murphy-Durrell Diagnostic Reading Readiness Test)

Note: The Sentence Meaning variable does not have information available for converting raw scores to grade equivalents. Thus raw scores have been reported to the nearest tenth.

Main Effects. The second hypothesis of the study predicted that for year two and year three, treatments B+ and P+, placing special emphasis on language structure as related to meaning, would produce significantly higher Sentence Meaning and Paragraph Meaning comprehension achievement than treatments B and P respectively.

The main effect differences at year two revealed that treatment P+ produced significantly higher Paragraph Meaning comprehension achievement than did treatment P. This .3 year difference would appear to be of practical significance. A comparatively high F value suggests a possible trend favoring treatment P+ over treatment P on the Sentence Meaning variable at year two. No other significant differences or trends were noted.

At year two, treatment B was found to produce significantly higher Paragraph Meaning achievement than treatment B+. This finding was in reverse of the predicted direction, and would also appear to be of practical significance, as reflected in a .3 year gain favoring treatment B. No other significant variations or trends were evident.

A significant interaction was found on the Paragraph Meaning variable between treatment and supplement at the second year level. This interaction was interpreted to suggest that the language structure supplement (+) operated more favorably with Program P in the P+ treatment than with Program B in the B+ treatment. An earlier discussion suggested that the regular correspondences used in the supplement (+) of the P+ treatment might have enhanced decoding skills to a greater extent than the irregular correspondences used in the vocabulary of the supplement (+) of the B+ treatment. Additionally a second variation which may have inflated the

mean differences producing the significant interaction could have resulted from the time differential which required subjects in treatment B+ to spend 15 minutes three times each week on the language structure supplement (+), while treatment B subjects continued to work through the regular basal program. This effect is suggested in the superior year two performance of treatment B subjects over treatment B+ subjects on the Word Study Skills variable (.9 year difference by inspection from Table 12). Although a similar effect might be expected for the contrast between children in treatment P and those in treatment P+, this was not the case, and the superiority of pupils in treatment P+ would appear to be due to the positive interaction between treatment and the structural supplement. Thus treatment B+ subjects would appear to be handicapped in the ability to decode words when contrasted with those in treatment B and treatment P+. If such were the case, pupils in treatment B+ would then have been unable to utilize the comprehension skills developed in the structural supplement (+). As a result, treatment B+ subjects might be expected to perform relatively less well than treatment B subjects in decoding the comprehension passages, thus explaining the significant interaction. This finding and explanation should be pursued in future research.

Exploratory Questions. The final part of each exploratory question considered significant variation at year two and year three which might exist in comprehension skills between the various reading programs for children within designated levels of Mental Age, Socioeconomic Status, Chronological Age, and Sex categories.

Exploratory Question: Sentence Meaning. No significant differences were found on any treatment contrasts within the independent variable

categories for the Sentence Meaning variable. Several comparatively large F values, however, suggest possible trends which deserve further research exploration. At the second year level, treatment P+ produced higher mean values than treatment P for subjects in the following categories: High Mental Age, Low Socioeconomic Status, and Male. For the third year, higher mean values were noted for subjects in treatment P+ when contrasted with treatment P within the following categories: High Chronological Age, Low Socioeconomic Status, and Female.

The contrasts between treatment B and treatment B+ revealed no significant differences; however, one comparatively large F value may be suggestive of a trend. This mean difference favored treatment B over treatment B+ at year two for the subjects in the Low Chronological Age category.

Exploratory Question: Paragraph Meaning. Mean contrasts for the Paragraph Meaning comprehension variable revealed several significant differences. At year two, subjects in treatment P+ produced significantly higher Paragraph Meaning comprehension scores than those in treatment P within the following categories: High Mental Age, High and Low Socioeconomic Status, and Male. These differences were found to be .9 year, .5 year, .5 year, and .4 year respectively, and appear to be of sufficient magnitude to be of practical significance.

No other significant differences were found on this contrast; yet several trends were suggested by comparatively high F values. Children in treatment P+ produced higher mean values than those in treatment P at year two in the Female category (.3 year) and at year three in the High Chronological Age (.3 year) and Low Socioeconomic Status (.4 year) categories.

In reverse of the predicted direction, subjects in treatment B at year two produced significantly higher Paragraph Meaning scores than in treatment B+ when classified as High Socioeconomic Status, and Female. These differences were .4 year and .5 year, and thus suggest findings which may be of practical significance.

Although no other significant differences were found for the contrasts between treatment B and treatment B+, several comparatively high F values were noted. These differences favored treatment B over treatment B+ for children classified as High (.7 year) and Mid (.3 year) Mental Age for year two, and as High Mental Age (.5 year) at year three.

Third Hypothesis--Oral Language Variables and Comprehension

Paragraph Meaning comprehension and Sentence Meaning comprehension of second and third grade subjects were found to be a function of the control which the subjects exhibited over designated aspects of (a) their morphological language system, and (b) their syntactical language system at the beginning of grade one. Specifically, at year two the correlation between the oral language morphological variable and Paragraph and Sentence Meaning comprehension was found to be .37 and .42 respectively; at year three the correlations were .36 and .38 respectively.

Year two correlations between the oral language syntax variable and the reading comprehension variables of Paragraph and Sentence Meaning comprehension were .55 and .57 respectively. Year three correlations were .56 and .50 for the respective variables.

## Conclusions

The following conclusions based on the findings must be considered within the limitations of the investigation.

1. In regard to the first hypothesis, it was concluded that for year two and year three the reading program making provision for a high degree of consistency in grapheme-phoneme correspondences and placing special emphasis on language structure as related to meaning (P+) produced significantly higher (a) Word Study Skills, (b) Regular Word Identification, (c) Irregular Word Identification, and (d) Word Meaning achievement than did the reading program making little provision for consistent correspondences and emphasizing language structure as related to meaning (B+), except for year three where no difference was noted on Irregular Word Identification and Word Meaning achievement.

No significant difference was found in the predicted direction between achievement levels for the program emphasizing consistency in correspondences (P) and the program placing little emphasis on control of correspondences (B). A significant difference was noted, however, at the second year in reverse of the predicted direction, favoring the latter program on the Word Study Skills variable. Hence it was concluded that the treatment placing little emphasis on grapheme-phoneme correspondences (B) produced significantly higher Word Study Skills achievement than did the treatment placing a high degree of control on correspondences (P).

The above findings closely parallel those of the first-year study and suggest that the supplementary aspects (+) of the P+ and B+ treatments interacted differently with the P program than with the B program. It is possible that the significant differences favoring Program P+ over

Program B+ on decoding skills could be due to the additional reinforcement obtained from the highly regular correspondences used in the vocabulary of the supplementary aspect (+) of the P+ treatment, as contrasted with the highly irregular vocabulary used with the supplement (+) for the B+ treatment.

2. In regard to the second hypothesis of the study, it was concluded that at year two the program making provision for consistency in grapheme-phoneme correspondences and emphasizing language structure as related to meaning (P+) produced significantly higher Paragraph Meaning comprehension achievement than did the program making provision for consistency but placing no special emphasis on language structure as related to meaning (P).

No significant main effect was found in the predicted direction between the program emphasizing only language structure (B+) and the program placing no emphasis on language structure as related to meaning (B). A significant difference on the Paragraph Meaning variable was noted at the second year in reverse of the predicted direction favoring the latter program (B). It was therefore concluded that the treatment placing no special emphasis on language structure (B) produced significantly higher Paragraph Meaning comprehension than the treatment emphasizing language structure as related to meaning (B+).

This reversal parallels the findings of the first-year study and suggests that the language structure supplement (+) interacted more favorably with Program P in treatment P+ than with Program B in treatment B+ on the Paragraph Meaning variable. Again, it is possible that this interaction could have been produced by the additional reinforcement of consistent correspondences characteristic of the vocabulary used in the

language structure supplement (+) of treatment P+. Should this have been the case, as is suggested in the first conclusion above, the subjects in the P+ treatment could then have mobilized the skills developed through the language supplement to perform at a higher level on the Paragraph Meaning comprehension task. As previously discussed, the time spent on the supplement (+) in the B+ treatment may have reduced the decoding emphasis found in Program B while the treatment B pupils continued to work ahead in Program B. One would expect a similar depressing effect in treatment P+ when contrasted with treatment P; however, the supplement (+) appeared to reinforce the decoding skills in such a manner that this depressing effect was reversed.

3. Regarding the third hypothesis of the study, it was concluded that Paragraph Meaning achievement and Sentence Meaning achievement of second and third grade subjects at the end of grade two and grade three are a function of the control which the subjects exhibit over designated aspects of (a) their morphological language system, and (b) their syntactical language system at the beginning of grade one. A similar conclusion was drawn at the end of grade one.

4. The following conclusions consider the exploratory questions and are based on significant findings and trends. Although the trends have been identified as such and represent comparatively high nonsignificant mean differences, the reader is alerted to consider the trend statements with caution. The purpose for including them is to suggest variations which may hold future practical significance and which will be of value in generating recommendations for future research.

The conclusions related to the decoding skills are as follows:

a. For year two and year three, the reading program which possessed controlled consistency in correspondences and emphasized language structure as related to meaning (P+) was of greater benefit than the program which emphasized only language structure (B+), to children in the following classifications for the respective variables:

--High and Mid (trends) Socioeconomic Status, Mid Mental Age, and Female (trend for year two) on the Word Study Skills variable.

--High Mental Age on the Regular Word Identification variable.

--High Mental Age (trend) on the Irregular Word Identification variable.

--Mid Socioeconomic Status (trend at year two), and Female (trend for year three) on the Word Meaning variable.

b. For year two alone, treatment P+ was of greater benefit than treatment B+ to children classified as High and Mid Mental Age, High Socioeconomic Status, High Chronological Age, and Male on the Word Meaning variable.

c. For year three alone, treatment P+ was of greater benefit than treatment B+ to children in the following classifications for the respective variables:

--Low Mental Age, and Low Chronological Age (trend) on the Word Study Skills variable.

--High (trend) and Low Socioeconomic Status, and Low Mental Age (trend) on the Regular Word Identification variable.

--Low Socioeconomic Status on the Irregular Word Identification variable.

d. For year two alone, the treatment emphasizing only language structure (B+) was of greater benefit than the program controlling correspondences and emphasizing language structure (P+), to children in the following classifications for the respective variables:

--Low Chronological Age, and Male on the Regular Word Identification variable.

--Male for the Irregular Word Identification variable.

e. For year two alone, the treatment which did not control correspondences (B) was of greater benefit than the program controlling correspondences (P), to children classified as High Mental Age, High and Low Socioeconomic Status, Mid Chronological Age, and Male on the Word Study Skills variable.

f. For year three alone, treatment B was of greater benefit than treatment P to children classified as Low Socioeconomic Status on the Word Meaning variable.

g. For year three alone, the program controlling correspondences (P) was of greater benefit than the program which did not control correspondences (B), to children classified as Low Chronological Age on the Regular Word Identification variable.

The following conclusions are based on significant findings and trends relative to the exploratory questions for the comprehension variables.

h. For year two and year three, the reading program which possessed controlled consistency in correspondences and emphasized language structure as related to meaning (P+) was of greater benefit than the program which only emphasized control over consistency (P), to children in the following classifications for respective comprehension variables:

--Low Socioeconomic Status on the Sentence Meaning variable (trend).

--Low Socioeconomic Status on the Paragraph Meaning variable (trend at year three).

i. For year two only, treatment P+ was of greater benefit than treatment P to children in the following classifications for the respective variables:

--High Mental Age (trend), Low Socioeconomic Status (trend), and Male (trend) on the Sentence Meaning variable.

--High Mental Age, High and Low Socioeconomic Status, Male, and Female (trend) on the Paragraph Meaning comprehension variable.

j. For year two and year three, the treatment which did not control correspondences nor emphasize language structure (B) was of greater benefit than the program emphasizing language structure (B+), to children in the High Mental Age group on the Paragraph Meaning variable (trend for year one and year two).

k. For year two alone, treatment B was of greater benefit than treatment B+ to children in the following classifications for the respective variables:

--Low Chronological Age (trend) on the Sentence Meaning variable.

--High (trend) and Mid (trend) Mental Age, High Socioeconomic Status, and Female on the Paragraph Meaning variable.

## Summary, Implications, and Recommended Research

As one examines the conclusions of the second and the third year of the investigation for practical implications and for research recommendations, several significant points emerge.

First, the treatment which controlled regularity of grapheme-phoneme correspondences and emphasized language structure (P+) produced consistently higher decoding skills than did the treatment which did not control correspondences but emphasized language structure (B+). These findings were not only identified with the main effects but also were noted with some regularity for various categories of Mental Age, Socioeconomic Status, and for girls, at year two and year three. These differences ranged from .3 of a year to 1.2 years, thus suggesting the practical significance of the findings.

Second, the treatment which did not control for consistency of correspondences (B) produced consistently higher Word Study Skills achievement at year two than did the treatment which carefully controlled the correspondences (P). This difference also appeared to be consistent for various levels of Mental Age and Socioeconomic Status, and apparently was of greater advantage to boys for year two. The differences ranged

from .7 of a year to 1.8 years, thus emphasizing the practical significance of the difference.

These findings suggest that at year two and year three, the language structure supplement (+) interacted more favorably with Program P in the P+ treatment than with Program B in the B+ treatment on decoding skills achievement. It is suggested that this different interaction may have been produced because of reinforcement variation stemming from the different vocabulary used in the P+ and B+ supplements. This possible explanation deserves consideration in future research.

It is evident from the findings that the precise control of the consistency of grapheme-phoneme correspondences (P) in the vocabulary used did not produce the expected superiority in decoding skills when contrasted with the program placing little emphasis on correspondence control (B) for the second and third years of the study. When one considers the carefully developed control of teachers (the same teachers taught the subjects at both first and second grade) ahd pupil variation, as well as the use of blocking and covariate analysis, the results would appear to be due to program variation. It should be stressed, however, that the second and the third year findings on the decoding variables are to a large extent in reverse of the first-year findings,[5] which favored the treatment emphasizing careful control (P) over the grapheme-phoneme correspondences. Hence the early decoding advantage offered in the

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[5]Robert B. Ruddell, The Effect of Four Programs of Reading Instruction with Varying Emphasis on the Regularity of Grapheme-Phoneme Correspondences and the Relation of Language Structure to Meaning on Achievement in First-Grade Reading, pp. 43, 51.

program emphasizing consistent control over correspondences decreased to a great extent by the end of second grade, where the program which did not control the consistency of correspondences held a distinct advantage. This may suggest that the important variable which explains the reverse findings for year two and year three is the introduction of the correspondences, which occurred later in the treatment emphasizing little correspondence control, rather than the careful control over consistent relationships presented in the vocabulary. It is also possible that certain children, such as the High Mental Age and High Socioeconomic Status subjects, are able to arrive at their own decoding generalizations through extensive reading at home and in school, and as a result gain little advantage from the careful control of grapheme-phoneme correspondences. These various hypotheses deserve research consideration. Additionally, an intensive research effort is needed to explore the psychological reality of linguistic units (e.g., phonemes, morphophonemes, morphemes, and their graphic equivalents) used in the decoding phas· of reading programs. The relationship between children's perceptual and conceptual development, the various linguistic units and reading achievement should be examined in future research.

An early benefit, observed in the first-grade study, which might be attributed to superior decoding skills resulting from the program exerting careful control over correspondences, was the more extensive reading of trade books.[6] Consideration should thus be given to the careful selection of superior characteristics of diverse reading programs at various

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[6] Ibid., p. 170.

developmental levels and the possible incorporation of these characteristics into a total instructional program in the classroom, leading to superior decoding and comprehension achievement.

Third, at year two the treatment which controlled correspondences and emphasized language structure as related to meaning (P+) produced consistently higher Sentence Meaning (trend) and Paragraph Meaning comprehension skills achievement than did the treatment which emphasized only control over correspondences (P). These findings at year two were consistent to a high degree for High and Low Socioeconomic Status subjects as well as for High Mental Age subjects, and boys. These findings appear to be of practical significance as reflected in scores ranging from .3 to .9 of a year, and suggest that a balanced emphasis should be developed between decoding and comprehension skills in reading instruction. Again, various positive characteristics of reading programs should be considered, and an attempt should be made to incorporate these characteristics into the total instructional program. It is emphasized, however, that this recommendation should be studied in future research.

Fourth, at year two the treatment which did not place special emphasis on grapheme-phoneme correspondences, nor use the language structure supplement (B), was found to produce superior Paragraph Meaning comprehension achievement over the parallel treatment using the structural supplement (B+). Consistent differences in the same direction were also noted for High Socioeconomic Status subjects and girls at year two. Ranging from .3 to .5 of a year, these findings would appear to be of practical significance. An inspection of Table 12 reveals that subjects in the former treatment possessed decoding skills markedly superior to those in

the latter treatment (.9 of a year on the Word Study Skills variable at year two). This difference in decoding skills may partially explain the comprehension variation observed above and, as previously discussed, may have been due to the instructional time differential favoring treatment B. These findings indicate that treatment B possesses a definite superiority over treatment B+. Future research, however, should examine these treatments under conditions utilizing equivalent instruction time for Program B in treatments B and B+. Additional provision should be made for the 15 minutes used three times each week for instructional supplement (+). This recommendation is made in light of the comprehension differences found favoring treatment P+ over treatment P.

Fifth, the significant relationship observed between the subjects' control over morphological and syntactical elements in oral language and their Sentence and Paragraph Meaning comprehension suggests the need to weigh carefully significant interrelationships in language skills development. Concern should be given to possible use of the former elements in reading readiness instruments. Classroom teachers should also possess an awareness of the potentially important role which these dimensions of oral language play in reading achievement. This concern receives support from the research of Graves[7] and Hartson,[8] which was directly connected with data collected in this investigation.

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[7]Barbara W. Graves, "A Comparative Study of the Reading Achievement and Syntactical Language Development of Two Socioeconomic Groups" (unpublished Master's thesis, School of Education, University of California, Berkeley, 1966). See Abstract in Appendix A.

[8]Eleanor K. Hartson, "The Relationship Between Oral Language Development and Written Language of First and Second Grade Children: A Comparison of Socioeconomic Groups" (unpublished Master's thesis, School of Education, University of California, Berkeley, 1967). See Abstract in Appendix A.

Sixth, the possible transfer value of decoding and reading comprehension skills to encoding, written expression, and oral communication skills also deserves further study. This was not the primary concern of the immediate investigation, but supportive evidence may be found in the research of Henry,[9] Ahern,[10] Baele,[11] and Crawford.[12] These studies were likewise directly connected with data collected in the present investigation.

Seventh, as the investigator designed and conducted this longitudinal study he was constantly aware of the need for more refined measuring instruments which could be utilized in tapping specific dimensions of reading achievement. For the present study it was necessary to design decoding, comprehension, and oral language measures. It is believed that the standardized instruments which were available were of limited value because of their gross nature. This area should be given careful study, and a variety of instruments should be constructed to measure various specific facets of decoding, comprehension, and attitudinal factors in reading.

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[9]Harold L. Henry, "The Effect of Contrasting Reading Programs with Varying Emphasis on the Regularity of Phoneme-Grapheme Correspondences on Third Grade Spelling Achievement" (unpublished Doctoral dissertation, School of Education, University of California, Berkeley, 1967). See Abstract in Appendix A.

[10]Evelyn J. Ahern, "The Effect of Four Primary Reading Programs on the Complexity of Written Language Structure at the Second Grade Level" (unpublished Doctoral dissertation, School of Education, University of California, Berkeley, 1967). See Abstract in Appendix A.

[11]Ernest R. Baele, "The Effect of Primary Reading Emphasizing Language Structure as Related to Meaning upon Children's Written Language Achievement at the Third Grade Level" (unpublished Doctoral dissertation, School of Education, University of California, Berkeley, 1968). See Abstract in Appendix A.

[12]Leslie W. Crawford, "The Relationship Between Two Varying Primary Reading Programs and Selected Syntactical Variables in Children's Language Development" (unpublished Doctoral dissertation, School of Education, University of California, Berkeley, 1967). See Abstract in Appendix A.

## A Concluding Statement

A basic objective of this longitudinal investigation was to provide increased insight into the relationship between unique characteristics of reading programs and the reading achievement of primary school children. A secondary objective was also concerned with the relationship between oral language variables and reading achievement. The research design, the data collected, and the resulting conclusions have made provision for the above objectives only in part. As with the great majority of research projects, this study raises many questions which will require future consideration within controlled laboratory settings and in field research settings. Its value lies mainly in the provision of significant information through an experimental approach to determine the relationship between reading program characteristics, pupil characteristics, and reading achievement in realistic classroom settings.

There is a continued need to conduct carefully controlled longitudinal research studies of this nature if recently developed programs possessing characteristically new and different instructional approaches are to be evaluated. This approach, combined with laboratory experimentation, is essential if reading researchers and classroom teachers are to obtain further understanding of the relationship between reading program characteristics, pupil characteristics, and reading achievement.

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# APPENDICES

# APPENDIX A

## ABSTRACTS OF DOCTORAL DISSERTATIONS AND MASTER'S DEGREE THESES COMPLETED IN RELATED LANGUAGE SKILLS AREAS

| Name | Degree | Date |
|---|---|---|
| Harold L. Henry | Ed.D. | 1966 |
| Barbara W. Graves | M.A. | 1966 |
| Eleanore K. Hartson | M.A. | 1966 |
| Leslie W. Crawford | Ed.D. | 1966 |
| Evelyn J. Ahern | Ph.D. | 1966 |
| Ernest R. Baele | Ed.D. | 1967 |

The following research projects were completed utilizing data from various aspects of the three-year longitudinal study.

ABSTRACT OF DOCTORAL DISSERTATION

# The Effect of Contrasting Reading Programs with Varying Emphasis on the Regularity of Phoneme-Grapheme Correspondences on Third Grade Spelling Achievement

By

Harold Loyd Henry (1966)

Although the English writing system is basically alphabetic in nature, the correspondences between the phonemes of the language and their graphic representations are often inconsistent. Through the years, educators have tried numerous teaching approaches in their effort to overcome the reading and spelling difficulties presented by this lack of a one-to-one relationship.

## The problem

It was the purpose of this investigation to seek deeper insight into pertinent factors in reading curricular materials which affect the spelling achievement of primary-grades children. The objectives were (1) to measure and compare the effect of contrasting reading programs upon spelling achievement, (2) to measure and compare the transfer of learning effect of the programs as related to spelling, and (3) to determine the relationship between particular background variables and spelling achievement as affected by the programs.

## Procedure

A spelling test was administered to 288 third-grade pupils of the Oakland, California, schools who had been taught for a period of three

school years through the use of selected reading materials. One comparison group was taught through the use of the Sheldon Basic Reading Series (1957), a basal which provided no control over the consistency in grapheme-phoneme correspondences in the vocabulary presented.

The second comparison group was taught reading through the use of the Sullivan Programmed Reading series (1963). This basal reader utilized a programmed format and provided a high degree of control over the consistency in grapheme-phoneme correspondences.

In addition to the basal materials, one half of each comparison group utilized unpublished supplements constructed by Ruddell which emphasized language structure as related to meaning. The two supplements differed only in vocabulary content, each featuring the vocabulary of the basal program it accompanied.

A four-part criterion test, which was constructed by the investigator, was administered to all subjects. Two sub-tests contained words that were introduced into both the Sheldon and the Sullivan basal materials and two others contained non-introduced (transfer) words. One sub-test of each pair contained regular words and the other contained irregularly-spelled correspondences. Words and their derivatives that were contained in the spelling materials utilized by the subjects in the experiment were judged inappropriate for measuring the effect of the reading programs on spelling and were therefore not utilized as test words.

The criterion data and appropriate pre-treatment aptitude data were analyzed through the ANOVA-Harvard two-way analysis of co-variance computer program. Individual contrasts were studied through the Scheffé technique.

## Findings and conclusions

The reading programs making provision for a high degree of consistency in grapheme-phoneme correspondences produced significantly higher regular word spelling achievement, irregular word spelling achievement, regular word spelling transfer achievement, and irregular word spelling transfer achievement than did the programs making little provision for consistent correspondences. The findings were consistently applicable to both boys and girls, to pupils at both the high and low intelligence levels, and to pupils at the high and median socioeconomic classifications. Differences at the low socioeconomic level failed to reach the selected .01 level of significance.

The findings lend support to the viewpoint that encoding skill is enhanced through the study of materials that exercise a high degree of control over the consistency in grapheme-phoneme correspondences in the vocabulary presented. The nonsignificant differences found at the low socioeconomic level seem to reiterate the often-stated need for specially constructed materials and rigorous research focused on unique needs of the culturally different child.

SEMINAR STUDY FOR THE DEGREE OF MASTER OF ARTS

# A Comparative Study of the Reading Achievement and Syntactical Language Development of Two Socioeconomic Groups

By

Barbara W. Graves (1966)

## Purpose

The primary purpose of this study was to investigate the relationship between the syntactical language development of entering first grade children and their reading achievement measured at the end of grade one.

## Hypotheses

The following hypotheses were designed to study the problem:

1. Children in the high socioeconomic group would not obtain significantly higher scores on the Test of Syntax given at the beginning of grade one.

2. There would be a significant positive correlation between scores on the Test of Syntax given at the beginning of grade one and paragraph meaning achievement scores obtained at the end of grade one.

3. There would be a significant positive correlation between scores on the Test of Syntax given at the beginning of grade one and vocabulary achievement scores obtained at the end of grade one.

4. There would be a significant positive correlation between scores on the Test of Syntax given at the beginning of grade one and the Primary Test of Syntax given at the end of grade one.

## Procedure

In order to analyze the relationship between syntactical language development and socio-ethnic status, two groups were contrasted: nineteen Caucasian subjects from Levels I and II of the Minnesota Occupational Scale, the high socioeconomic group, and nineteen Negro subjects from Levels VI and VII of the Minnesota Occupational Scale, comprising the low socioeconomic group. All subjects were part of the random sample of 140 drawn from the total population of the larger study for more intensive analysis.

The following instruments were used in this study:

The Fraser, Bellugi, Brown Test of Syntax was given, individually and orally, to the selected group of 140 students in October of 1964. The Primary Test of Syntax (sentence meaning comprehension) was administered to the selected group of 140 subjects in May, 1965, and the vocabulary and paragraph meaning subtests of the Stanford Achievement Test--Form A were administered in June of the same year.

It was also stated that an item analysis of the Test of Syntax given at the beginning of grade one would show that certain syntactical deviations would be a problem only for the low Negro group.

The scores related to Hypothesis 1 were tested for significant difference by the use of the t test. Using the Pearson Product Moment Formula, coefficients of correlation were calculated for both groups between scores on the Test of Syntax and: paragraph meaning, vocabulary achievement, and sentence meaning achievement scores. An item analysis was completed on the Test of Syntax, and errors were contrasted for the two groups.

## Conclusions

The following conclusions were based upon the findings related to the hypotheses considered in this study:

1. The degree of syntactical language control of entering first grade children is significantly related to the socio-ethnic status of the children's families.

2. The degree of syntactical language control of entering first grade children is significantly related to paragraph meaning comprehension at the end of the first grade.

3. Syntactical language control at the beginning of first grade is positively related but not significantly so to vocabulary achievement at the end of grade one. However, a positive relationship exists and it is possible that this might achieve significance with a larger sample.

4. The degree of syntactical language control at the beginning of first grade is significantly related to sentence meaning achievement at the end of first grade for the high socio-ethnic group. This relationship was positive but not significant for the low socio-ethnic group.

5. The use of certain syntactical forms represent an extreme problem for the low Negro group. These include agreement of subject and verb in the third person singular, excluding all forms of the verb to be, omission of auxiliary verbs, verb problems concerned with tense, and nonstandard or confusing use of possessive pronouns. These deviations are a relatively minor problem for the high Caucasian group.

# The Relationship Between Oral Language Development and Written Language of First and Second Grade Children: A Comparison of Socioeconomic Groups


## Abstract

Eleanore K. Hartson (1966)

### Purpose

The purpose of the study was to investigate the relationship between oral and written language development of two contrasting socioeconomic groups at the first and the second grade level.

### Hypotheses

The following null hypotheses were tested in this study:

1. There will be no significant correlation between oral language achievement of entering first graders and their written achievement scores at the end of the first grade.

2. There will be no significant difference on written composition scores at the end of the first grade between children in the high socioeconomic group and children in the low socioeconomic group.

3. There will be no significant difference on written composition scores at the end of the second grade between children in the high socioeconomic group and children in the low socioeconomic group.

4. Developmental growth in written composition, measured by a comparison of first and second grade composition scores, will not differ significantly between high and low socioeconomic groups.

### Procedure

Sample: The subjects of this study were part of a longitudinal study being conducted by Dr. Robert Ruddell of the University of California under a grant from the USOE. Dr. Ruddell's study involved 24 first grade

classrooms, 760 children, in Oakland, California, representing low, middle, and high socioeconomic levels, with six classrooms randomly assigned to each of four reading programs. A random sample of 140 from the total population was selected for more intensive study.

From the random sample a total of 35 children, on whom data for this study were available, was selected: 17 children represented levels I and II of the Minnesota Occupational Scale, and 18 children represented levels VI and VII of the Minnesota Occupational Scale.

Measures: Oral language achievement at the initial stage of grade one was measured by the Test of Syntax in October, 1964. Written language achievement was determined by an analysis of Restricted Stimulus Samples at the end of the first grade, June, 1965, and at the end of the second grade, June, 1966. Such an analysis included total word count, total sentence count, total communication units, average length of the sentence, and average length of the communication unit for each writing sample.

## Conclusions

The following conclusions are based on the findings in this study:

1. Oral language achievement, measured at the beginning of grade one, is significantly related to Total Word Count, Communication Units, Average Length of Sentence, and Average Communication Unit at the end of grade one for the low socioeconomic group. No significant relationship between oral language control and the number of sentences written by the low socioeconomic group was found.

2. The degree of oral language control of entering first grade high socioeconomic children, in this study, is significantly related only to the number of words written in their first grade compositions.

3. A comparison of written compositions at the end of the first grade, between high and low socioeconomic groups, revealed that the high group was able to write more and averaged longer sentences and communication units than the low socioeconomic group. It is noted, however, that second grade written compositions of the high and the low socioeconomic groups were not significantly different.

4. Developmental growth in written composition, comparing first and second grade written compositions, revealed developmental growth for both the high and the low socioeconomic groups; however, greater relative developmental gains were made by the low socioeconomic group.

ABSTRACT OF DOCTORAL DISSERTATION

# The Relationship Between Two Varying Primary Reading Programs and Selected Syntactical Variables in Children's Language Development

By

Leslie William Crawford (1966)

The study investigated the relationships between two reading programs (P, P+) emphasizing a high degree of grapheme-phoneme correspondence, but varying in emphasis on language structure as related to meaning, and children's syntactical oral-language development from grade one to grade three. The hypotheses were as follows: (a) beginning third graders in the program emphasizing a high degree of consistency in grapheme-phoneme correspondence and language structure as related to meaning would demonstrate a significantly greater control over syntactical items in oral language than beginning third graders in the program emphasizing only a high degree of grapheme-phoneme correspondence, and (b) children in both programs would make a significant increase during the two-year period in their ability to comprehend and produce selected syntactical items in oral speech. Of secondary concern was the relationship between children's oral language development and the background variables of socioeconomic status, mental age, and sex. Syntactical oral-language development was measured by a modified form of the Fraser, Bellugi, Brown Test of Syntax.

Subjects for the study consisted of 46 pupils from Program P and Program P+ of the Ruddell-Oakland Study. These students were the remaining members of the P and P+ programs' 1964 sub-sample of 80 students.

The investigation covered a period of two years. During this period students in the study had been taught reading in two contrasting reading programs emphasizing a high degree of consistency in grapheme-phoneme correspondence but varying in emphasis on language structure as related to meaning. Materials consisted of a published basal reading program offering controlled and programmed regularities of grapheme-phoneme correspondences presented in vocabulary and an unpublished supplement emphasizing language structure as related to meaning.

Findings did not support the basic assumption that there was any significant relationship between the reading programs and oral language development. There was no transfer from the treatment which emphasized language structure as related to meaning to children's ability to comprehend and produce syntactical items in oral language. However, the hypothesis that children would increase significantly in their ability to comprehend and produce syntactical items from the beginning of first grade to the beginning of third grade was supported by the findings. From the significant degree of increase in control over syntactical items, it was concluded that children's syntactical structures are not as well developed by first grade as was formerly believed. Of the three background variables studied, mental age appeared to be a better indicator of ability to comprehend and produce syntactical items than socioeconomic status and sex. Children classified in the High group showed greater increase of their ability to comprehend and produce syntactical items than children classified in the Low group. Sex difference appeared to be a poor indicator of ability to comprehend and produce syntactical items in oral language. When children were classified by grade on the basis of

socioeconomic status and mental age, the High group of both categories was found to have made a significantly greater increase in their ability to comprehend and produce syntactical items in oral language than the Low group of each category.

ABSTRACT OF DOCTORAL DISSERTATION

# The Effect of Four Primary Reading Programs on the Complexity of Written Language Structure at the Second Grade Level

By

Evelyn Jeanne Goggin Ahern (1966)

The purpose of this study was to determine whether programs of reading instruction which varied in the amount of emphasis placed on language structure as related to meaning and on the regularity of grapheme-phoneme correspondences would have significantly different effects on the complexity of written language structure at the second grade level.

It was hypothesized that a reading program emphasizing both consistency of correspondences and language structure as related to meaning (P+) would produce significantly greater written language complexity than either a program emphasizing only consistent correspondences (P) or one emphasizing only language structure as related to meaning (B+). Additional hypotheses stated that a reading program emphasizing only language structure as related to meaning (B+) or one emphasizing only consistent correspondences (P) would produce significantly greater complexity of written language structure than a program emphasizing neither (B).

Three exploratory questions investigated the relationship of socioeconomic status, intelligence, and sex to the complexity of written language structure of subjects in the four programs.

The basic reading text used in Program B did not emphasize control over grapheme-phoneme correspondences whereas the programmed text used in

Program P did. In Programs B+ and P+ subjects used the respective tests described above, but also used a supplement emphasizing language structure as related to meaning. Twenty-four classrooms were randomly assigned to each treatment group, equally divided between high, middle, and low socioeconomic areas. The time spent on reading and the language arts was held constant.

Seventy-five writing samples were randomly chosen from those written by subjects in each program in response to instructions to write about anything they wished.

An instrument to measure the complexity of written language structure was constructed by the investigator, using language variables which seemed to contribute the most to written language complexity at the second grade level. The validity and reliability of the instrument were established.

Testing of the hypotheses by analysis of covariance revealed no significant differences between the programs compared for any of the variables. However, Program P+ produced higher adjusted means for all of the variables than did B+. P+ also produced higher adjusted means for all except two variables than did P. No trend was apparent favoring either of the programs in the other two comparisons.

Subjects were categorized by socioeconomic level, mental age, and sex to investigate the three exploratory questions.

It was concluded that:

1. There were no significant differences between the programs in their effect on the complexity of written language structure.

2. There were no significant differences among the programs when subjects were divided by socioeconomic status.

3. When subjects were categorized by mental age, the program emphasizing both consistent correspondences and language structure as related to meaning produced significantly better results for the higher mental age group for movables, present participles as constituents of structures of modification and for the total of all the variables. The same program produced significantly more present participles as constituents of structures of modification for the low group also.

4. When subjects were divided by sex, only one variable, past participles as constituents of structures of modification, was produced to a significantly greater degree by any program.

ABSTRACT OF DOCTORAL DISSERTATION

# The Effect of Primary Reading Programs Emphasizing Language Structure as Related to Meaning upon Children's Written Language Achievement at the Third Grade Level

By

Ernest Raymond Baele (1967)

The purpose of this study was to determine whether reading programs undertaken in primary grade classrooms which emphasized language structure as related to meaning would have any significant positive effect on children's writing achievement at the third grade level.

It was hypothesized that the primary grade programs of reading instruction using the special supplement emphasizing language structure as related to meaning (Program B + and Program P+ ) as contrasted with the primary grade reading programs not using the special supplement emphasizing language structure as related to meaning (Program B and Program P) would have a significant positive effect on children's writing achievement at the third grade level in terms of: (a) mean number of communication units--a quantity of writing measure; (b) mean communication unit length--a quantity-quality of writing measure; (c) mean clausal depth--a quality of writing measure; and (d) mean adjusted clausal depth--a quality-quantity of writing measure.

Three exploratory questions investigated the relationship of mental age, socioeconomic status, and sex to the quantitative and qualitative aspects of writing achievement of children in reading programs which varied in emphasis on language structure as related to meaning.

The basic reading text used in Program B did not emphasize grapheme-phoneme correspondences, whereas the programmed text used in Program P did. In Programs B+ and P+, subjects used the respective texts described above but also used a supplement emphasizing language structure as related to meaning.

The study was based on an analysis of writing samples obtained from 160 third graders in twenty classrooms of the Oakland Unified School District. This sub-sample had been randomly selected from the 288 third-grade children remaining in the Ruddell-Oakland study at the conclusion of its third year. These pupils, representing a wide range of socioeconomic levels, had been taught reading for three consecutive years through the use of Reading Program B, Reading Program B+, Reading Program P, and Reading Program P+ materials. The time spent on reading and the language arts was held constant for all reading programs.

A Writing Analysis Instrument to measure the quantitative and qualitative aspects of writing achievement was constructed by the investigator. This instrument was comprised of four measures of writing achievement: (1) Measure of Number of Communication Units; (2) Measure of Communication Unit Length; (3) Measure of Clausal Depth; and (4) Measure of Adjusted Clausal Depth. The Measure of Clausal Depth, a writing quality measure, was specially designed for this study. Its validity and reliability were established. The Measure of Adjusted Clausal Depth, a modification of the Measure of Clausal Depth, was considered to be a quality-quantity measure, as indicator of consistent writing quality.

For the hypothesis and the exploratory questions the UVIC ANOVA one-way analysis of variance program was used. Subjects were categorized by mental age, socioeconomic level, and sex to investigate the three

exploratory questions.

It was concluded that:

1. The reading programs emphasizing language structure as related to meaning produced significantly higher writing achievement scores in terms of (1) larger number of communication units; (2) longer communication units; (3) greater clausal depth; and (4) greater adjusted clausal depth, than did the reading programs which did not emphasize language structure as related to meaning.

2. In regard to the exploratory questions, the reading programs which emphasized language structure as related to meaning did have positive transfer effect to the writing achievement of third grade children of both high and low mental age; high and low socioeconomic status; and for both boys and girls, as contrasted with their counterparts in the reading programs which did not emphasize language structure as related to meaning. The children of lower mental age benefited relatively more from the writing achievement transfer effect of the supplement as used in reading instruction than did the children of higher mental age. The boys benefited more from the writing achievement transfer effect of the supplement as used in reading instruction than did the girls.

# APPENDIX B

## PRIMARY TEST OF SYNTAX (REVISED)

1. Teacher Directions

2. B and B+ Treatments

3. P and P+ Treatments

## 1. PRIMARY TEST OF SYNTAX

NOTE: Before administering the test write each child's name in the appropriate space on the individual test.

A. Turn back the first page, containing the child's name, so that the sample item containing the first pictures is showing. Say: "Let's read the sentences that are next to the first two pictures."

"The kitten"

"The fish"

"A can"

"A big can"

Say: "Now look at the two pictures at the top of the page. The first picture is a kitten. The next picture is a fish. Draw a line from the first picture to the circle after the words that tell about the first picture." (Demonstrate with your copy.) (Check work to be sure children understand the task.)

B. Now read the second item to the children. Say:

1. "The big kitten"
2. "It ran fast"
3. "A fast fish"
4. "It went up"

Say: "Look at the two pictures in the middle of the page. The top picture is the big kitten. The next picture is a fast fish." Then say: "Draw a line from the top picture to the circle after the words that tell about the top picture. Then draw a line from the next picture to the circle after the words that tell about that picture." (Again demonstrate with your copy and check the children's work to

make certain they understand the task.) Say: "You see we have no pictures for two of the sentences."

C. For the third example item say: "This time I want you to draw the lines by yourself. Draw a line from each picture to the circle after the words that tell about the picture." After all the children have completed the item check their responses. Next read the item to the entire group. Say: "Now let's do it all together."

"The fast kitten is black." "A can ran to the kitten."

"The kitten went in the can." "The kitten ran to a can."

Continue: "Look at the two pictures at the bottom of the page. The top picture shows that the kitten went in the can. The next picture shows that the kitten ran to a can. So, you should have drawn a line from the first picture to the circle next to the words: "The kitten went in the can" because these words tell about that picture. (Demonstrate with your own copy.) For the second picture you should have drawn a line from the picture to the words: "The kitten ran to a can" because those words tell about that picture. (Demonstrate again with your own copy.) Say: "Do you all understand what you are to do? Are there any questions? Turn the page and draw a line from each picture to the sentence that tells about it. Be sure to do every page in your booklet. Do not skip any parts and after you finish with one page, turn it and do the next page until you have finished the test. You may start now."

Note to Teacher: This test should be completed in approximately 25 to 30 minutes. You should find that your faster children will finish in 15 to 20 minutes. Plan to have seat work exercises ready for these

children providing they finish early. Should your slower children need more than 25 or 30 minutes, extend the time factor by 10 minutes. This should not be a speed test. On the other hand, if a child has not completed the test within 30 to 40 minutes, he is undoubtedly having extreme difficulty on all items and the testing should be concluded. Please note the number of minutes in which your fastest children completed the test and the number of minutes taken by the slower children in completing the test. Record this time on this page of instructions.

Time for fast children: Started: Completed:

Time for slow children: Started: Completed:

# 2. PRIMARY TEST OF SYNTAX

## B and B+ Treatments

Robert B. Ruddell
Associate Professor of Education
University of California

CHILD'S NAME _____

BIRTH DATE _____

TEACHER _____

SCHOOL _____

DATE _____

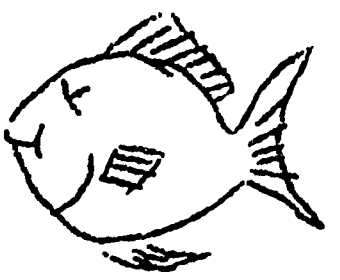
1.

The kitten. O

The fish. O

A can. O

A big can. O



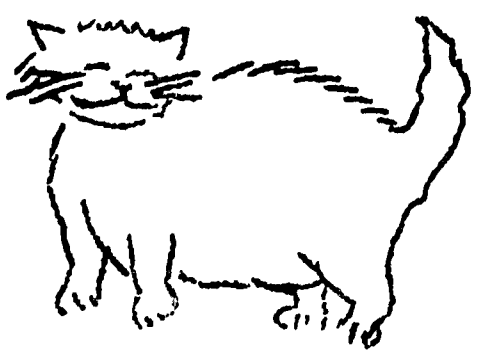
2.

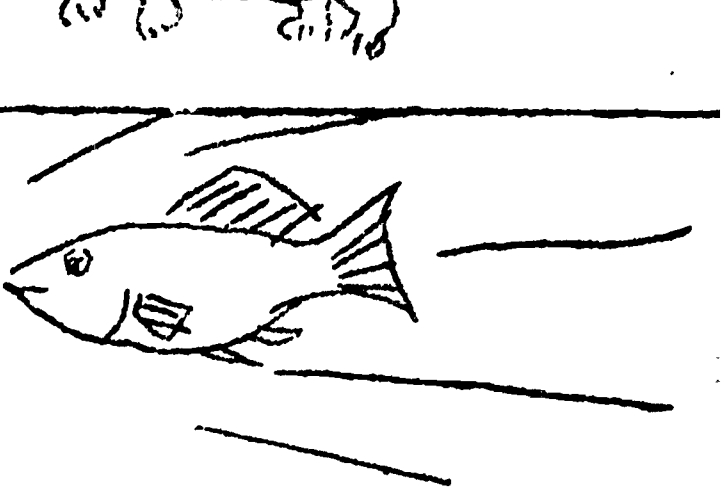
The big kitten. O

It ran fast. O

A fast fish. O

It went up. O





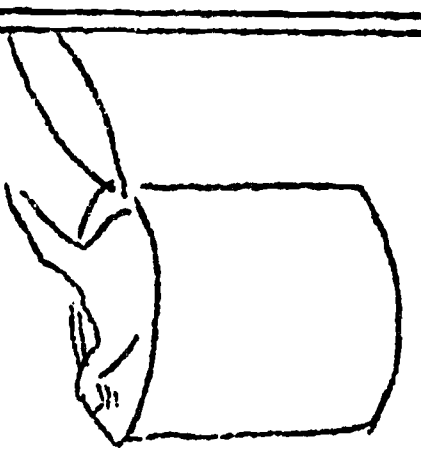
3.

The fast kitten is black. O

The kitten went in the can. O

A can ran to the kitten. O

The kitten ran to a can. O



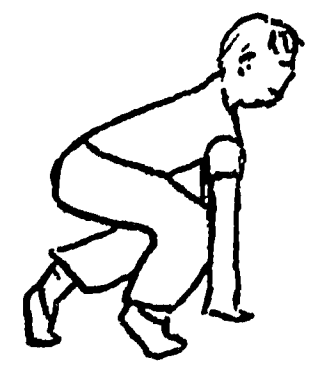
1.

Bill plays with the car. 0

Bill is running.0

Bill sees Linda.0

Bill will run. 0



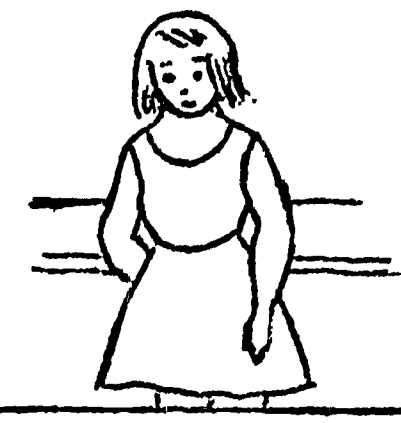
2.

Linda is not working. 0

Linda stops Ricky.0

Linda is working. 0

Linda gets a fish.0



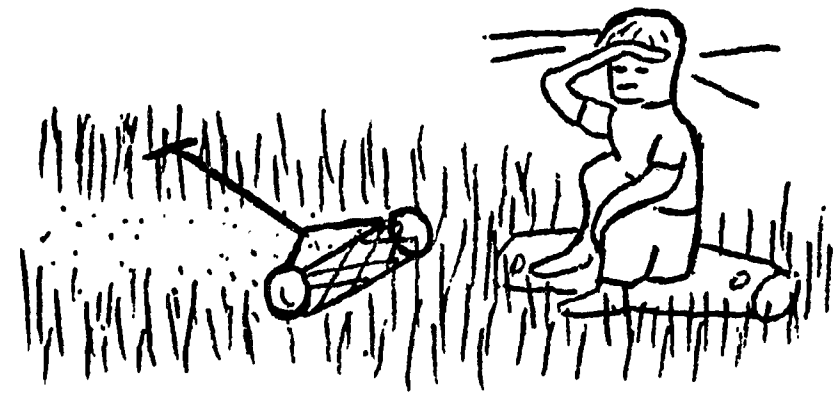
3.

Bill fishes. 0

Bill worked. 0

Bill plays with Rags. 0

Bill is working. 0



AB

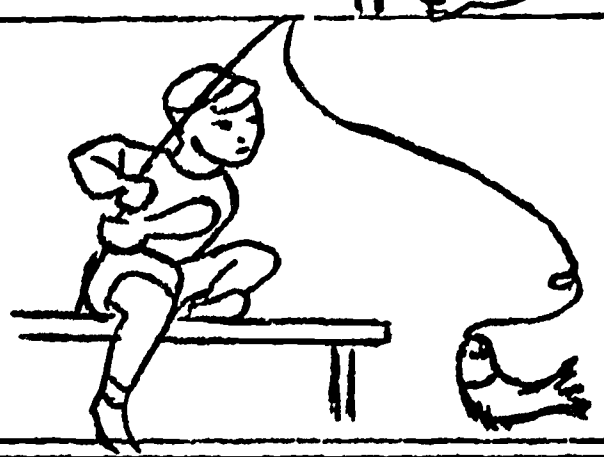
4.

Linda is at
home. 0

Linda fishes.0

Ricky fishes.0

Ricky works. 0



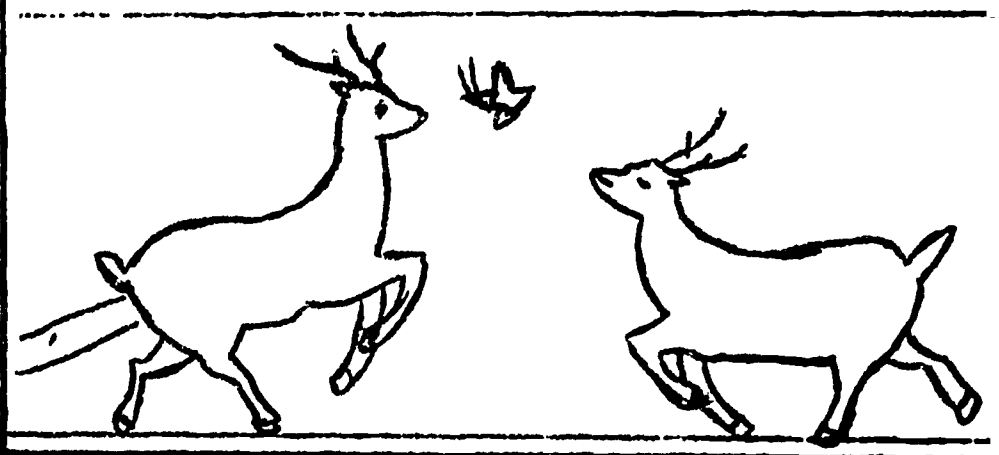
5.

The deer are
playing. 0

The deer looks
yellow. 0

The deer wants
ice cream. 0

The deer is
playing. 0



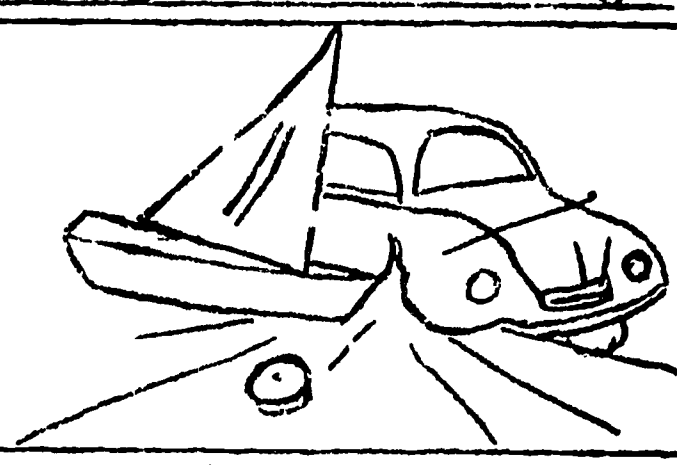
6.

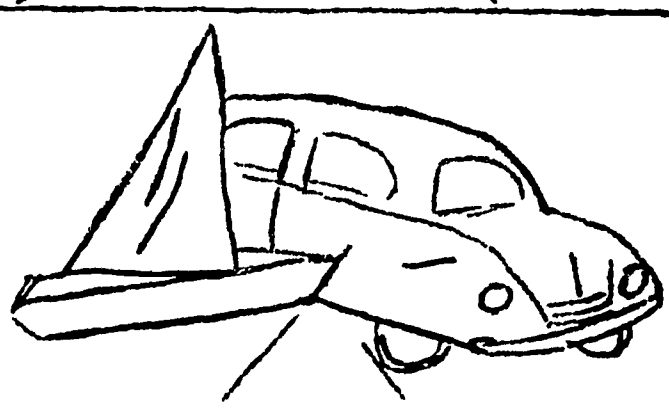
The boat hits very
easy. 0

The boat hits very
hard. 0

The boat is playing
with the fish.0

The boat runs
away. 0





7.

Bill is running. 0

Bill will eat the cookies. 0

Bill eats the cookies. 0

Bill wants to work.0

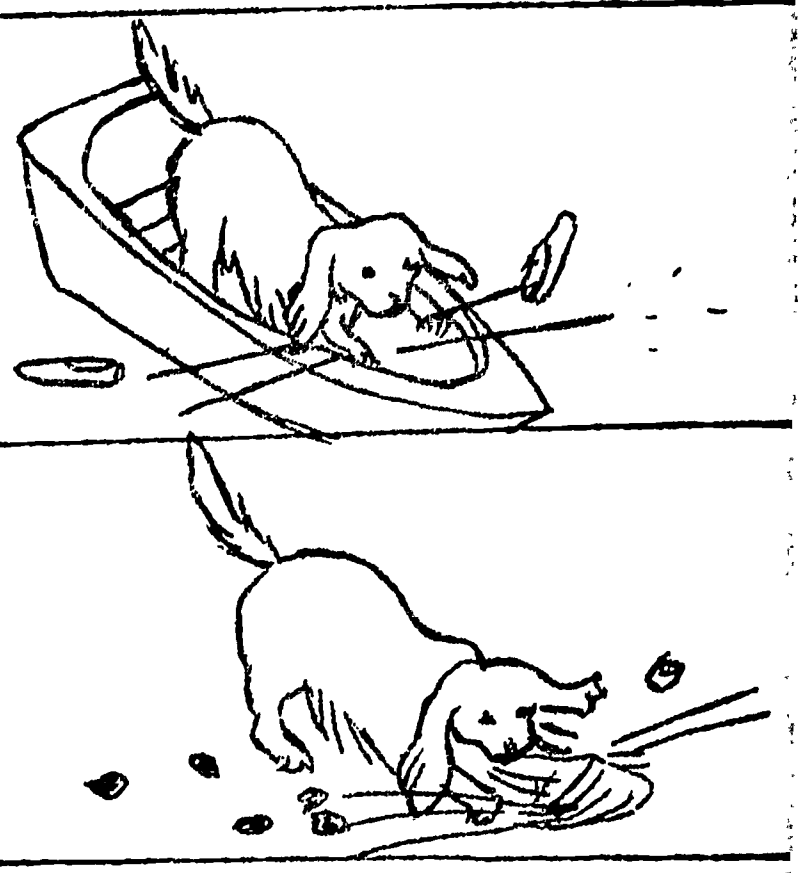
8.

Rags digs in the dirt. 0

Rags digs in the boat. 0

Rags jumps up and down. 0

Rags plays with Midnight. 0



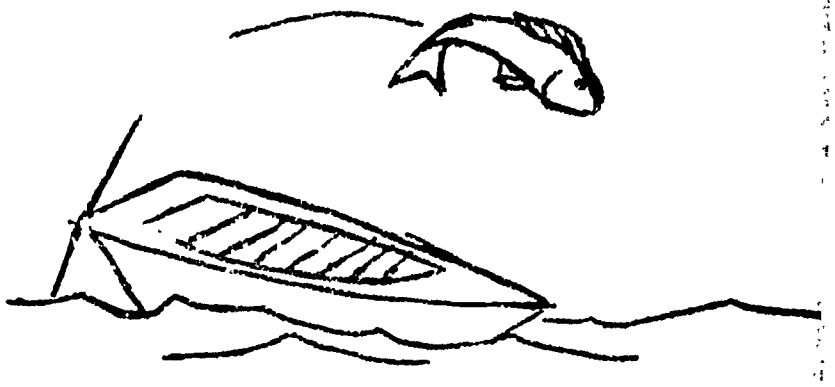
9.

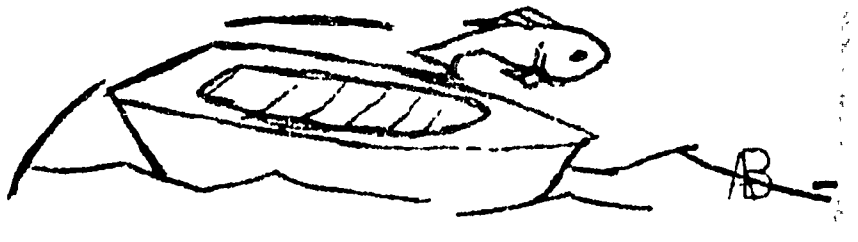
The fish looks at the ice cream.0

The fish is green and red. 0

The fish jumps very high. 0

The fish jumps very low. 0





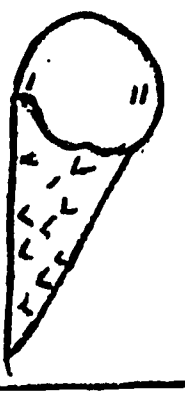
10.

My cookies. O

Some ice cream. O

Bill's car. O

An ice cream. O



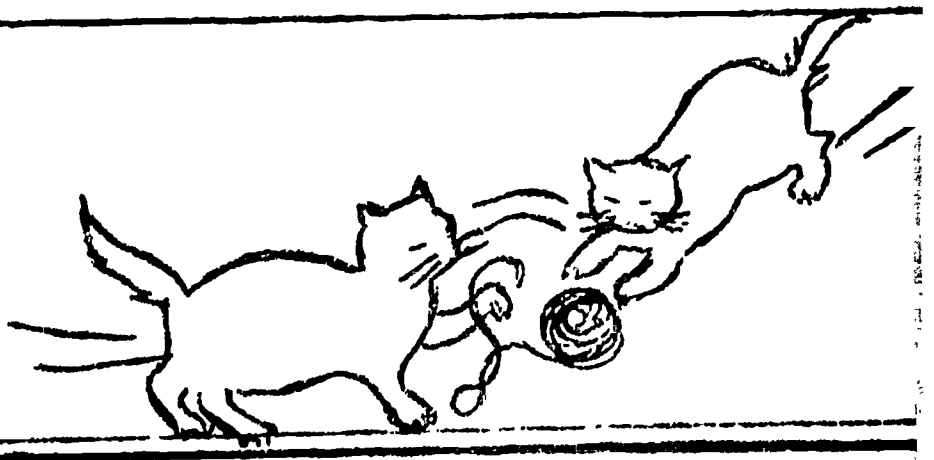
11.

The kittens look green. O

The kitten is fast. O

The kittens play. O

The kitten plays. O



12.

Ricky sees the funny ball. O

Ricky is stopped by Linda. O

Linda is stopped by Ricky. O

Linda rides in a car. O

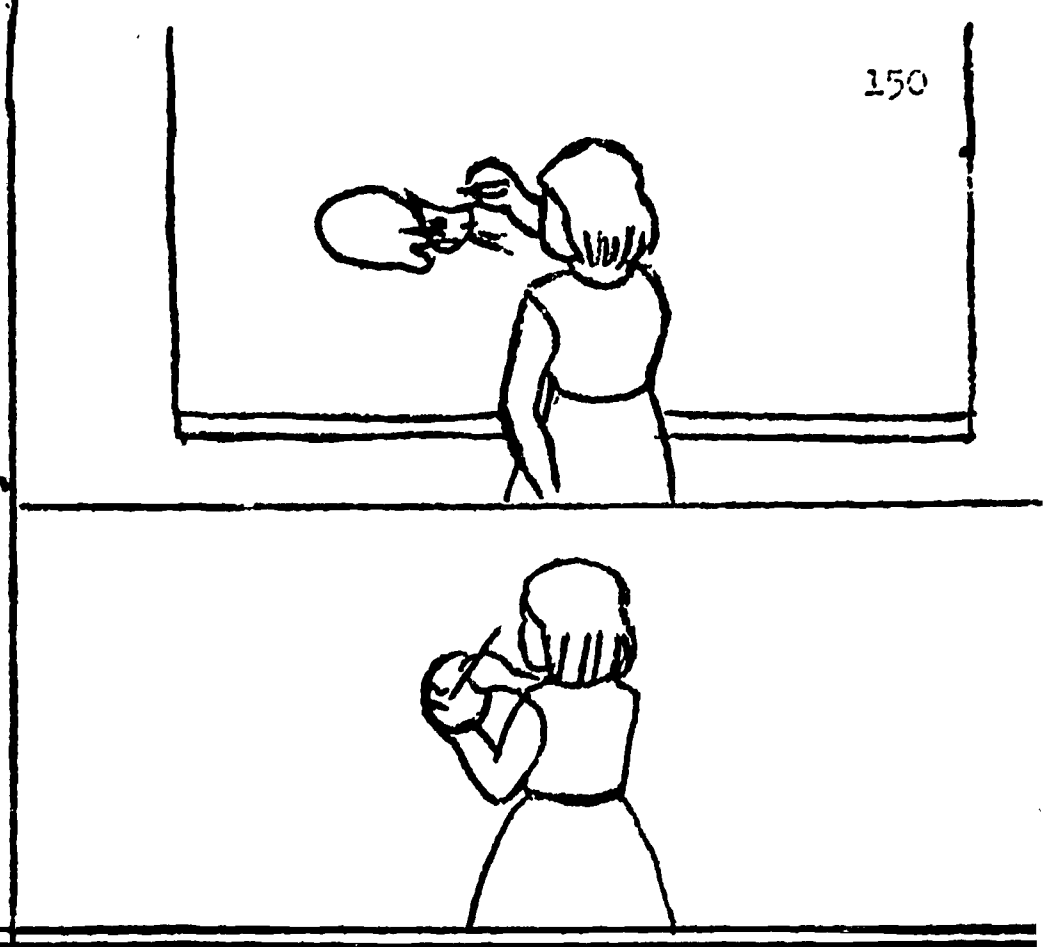
13.

Linda is running and jumping. 0

Linda draws on the ball. 0

Linda jumps the car and boat. 0

Linda draws on the board. 0



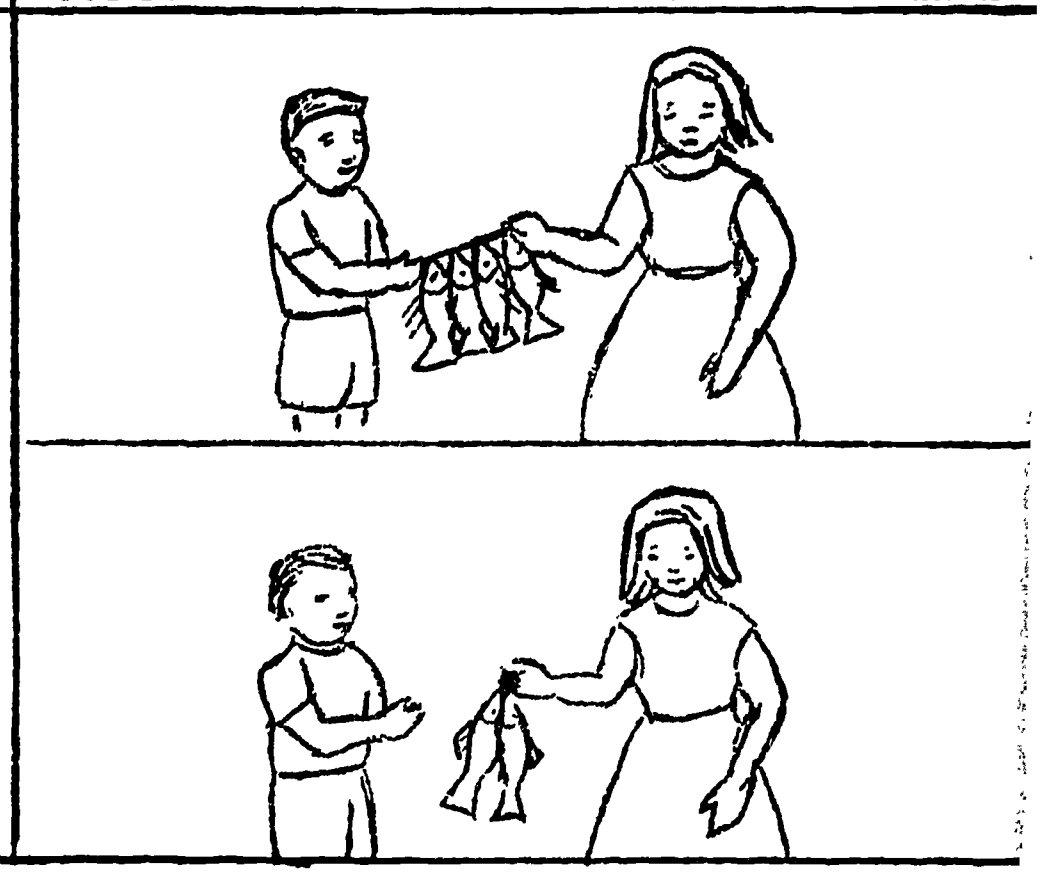

14.

Their Rags. 0

Her fish. 0

Their fish. 0

Her Rags. 0



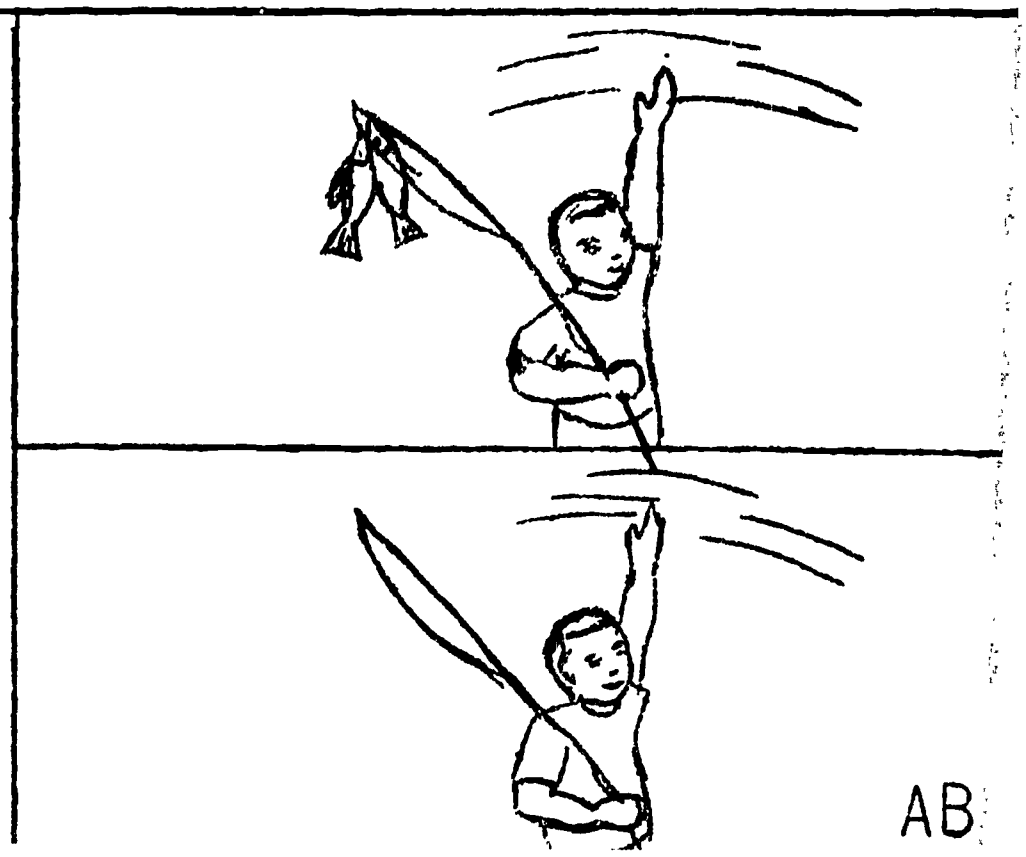
15.

Bill waves before fishing. 0

Bill waves after fishing. 0

Bill is riding. 0

Bill helps Daddy. 0



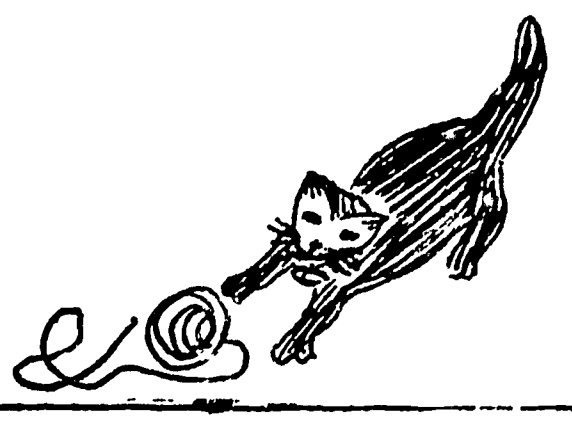
16.

Midnight plays after dinner. 0

Midnight sees the car. 0

Midnight wants to work. 0

Midnight plays before dinner. 0



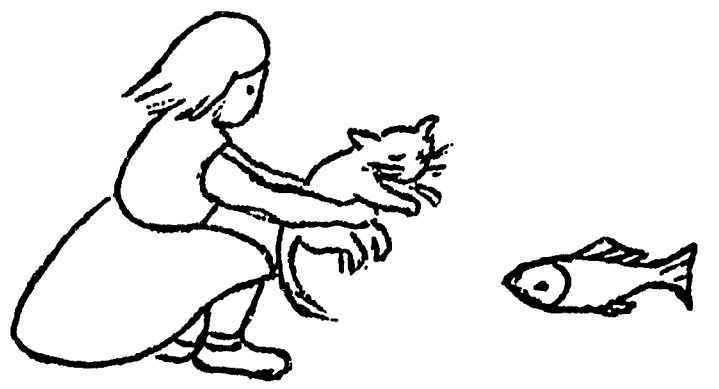
17.

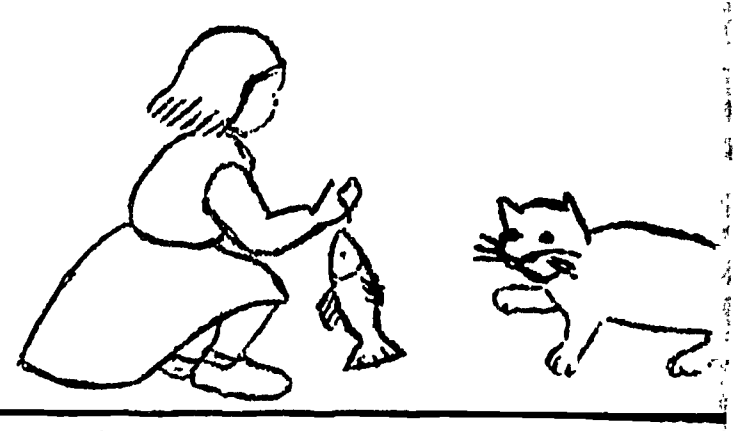
Linda is big and funny. 0

Linda brings the fish the kitten.0

Linda gets ice cream for Ricky. 0

Linda brings the kitten the fish.0





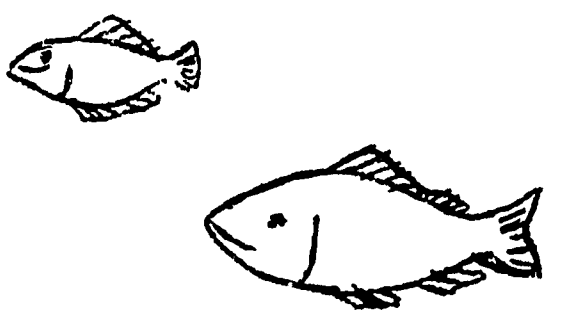
18.

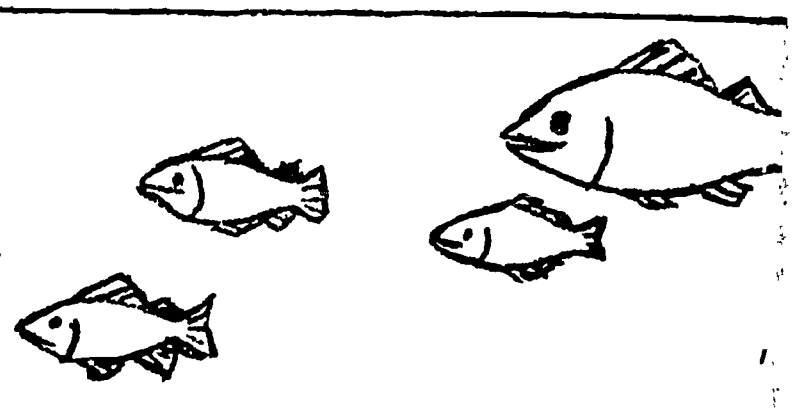
The fish works fast. 0

The fish are little.0

The fish is little.0

The fish jumps up.0





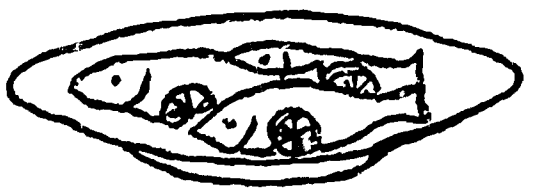
19.

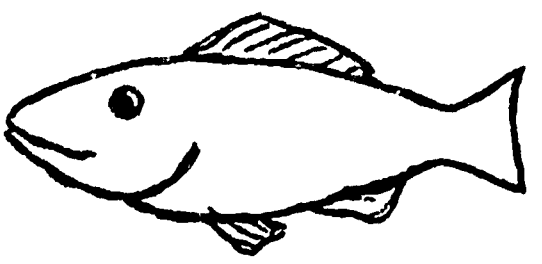
A fish. O

Go fast. O

Help me. O

Some fish. O





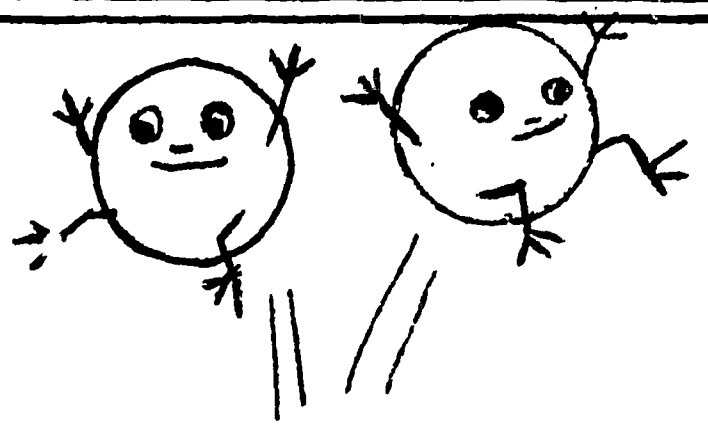
20.

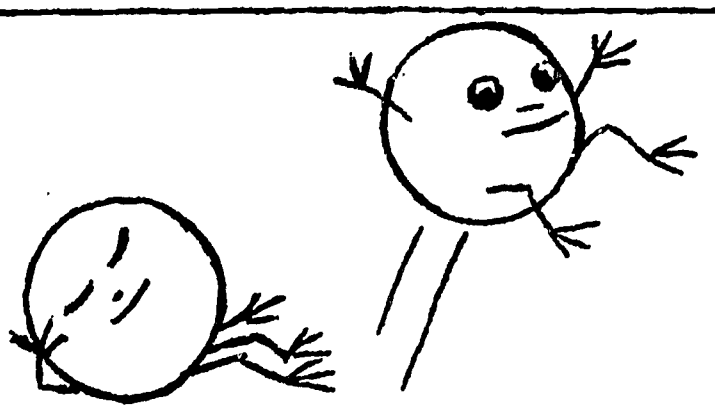
The ball is yellow.O

The ball jumps. O

The ball helps Daddy. O

The balls jump. O





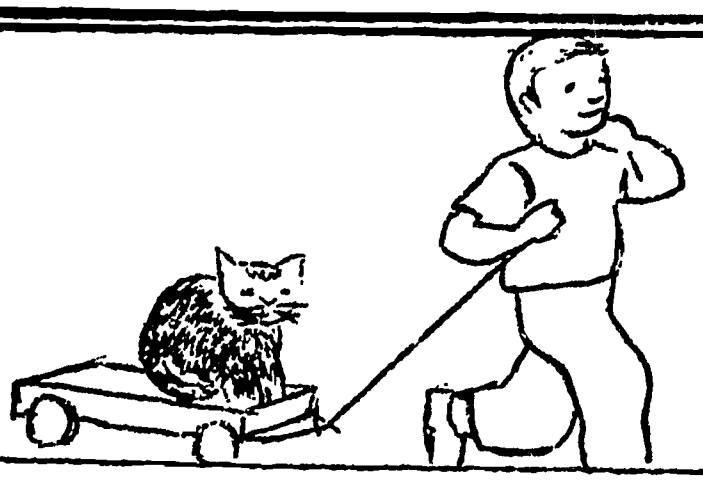
21.

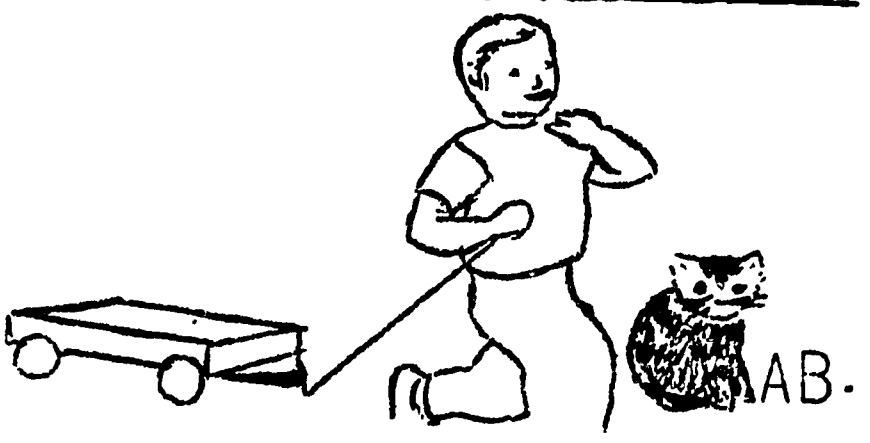
Midnight is blue. O

Midnight is riding.O

Midnight is not riding. O

Midnight jumps down. O





AB.

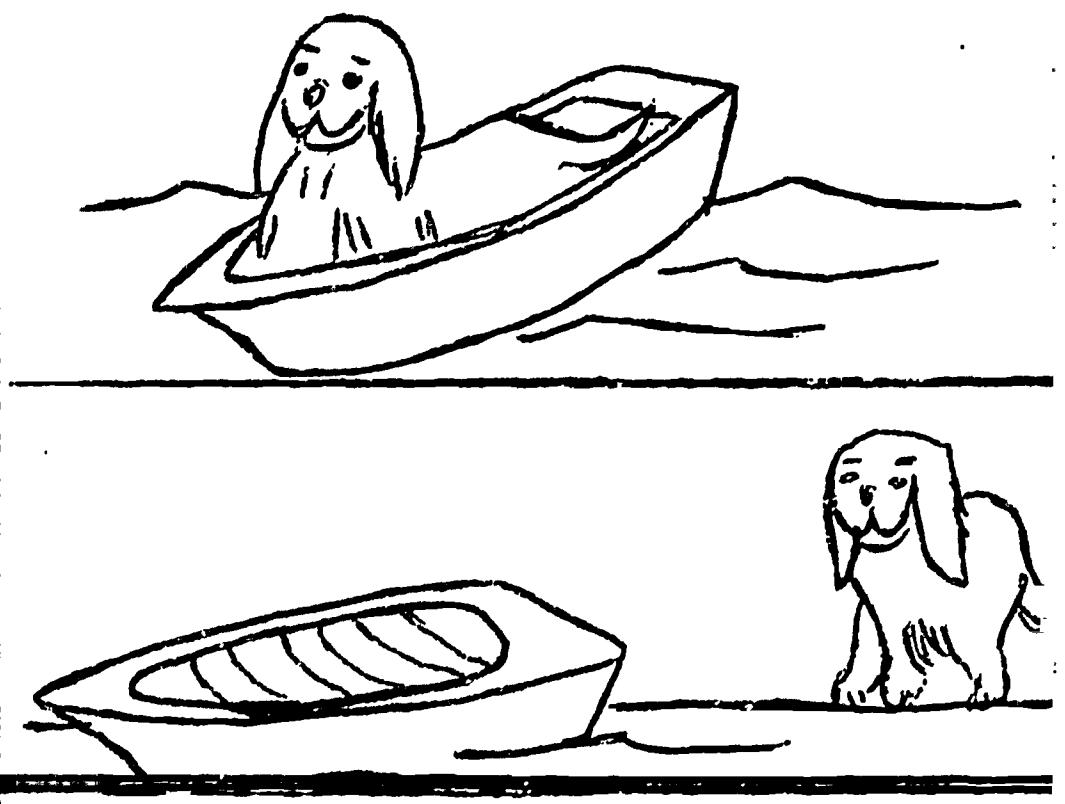
22.

Rags is fishing. 0

Rags will ride the boat. 0

Rags rides the boat. 0

Rags makes ice cream. 0



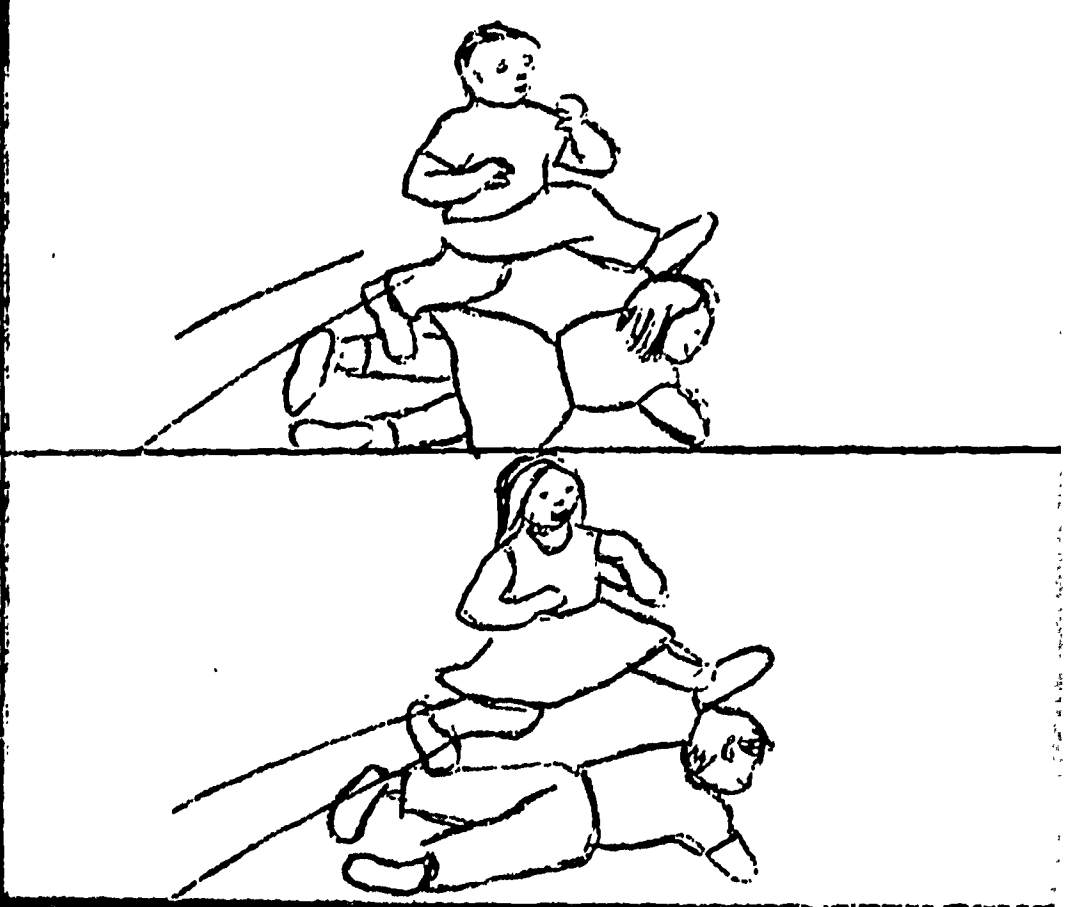
23.

Linda jumps Bill.0

Bill jumps Linda.0

Bill stops the ball. 0

Linda helps Ricky. 0



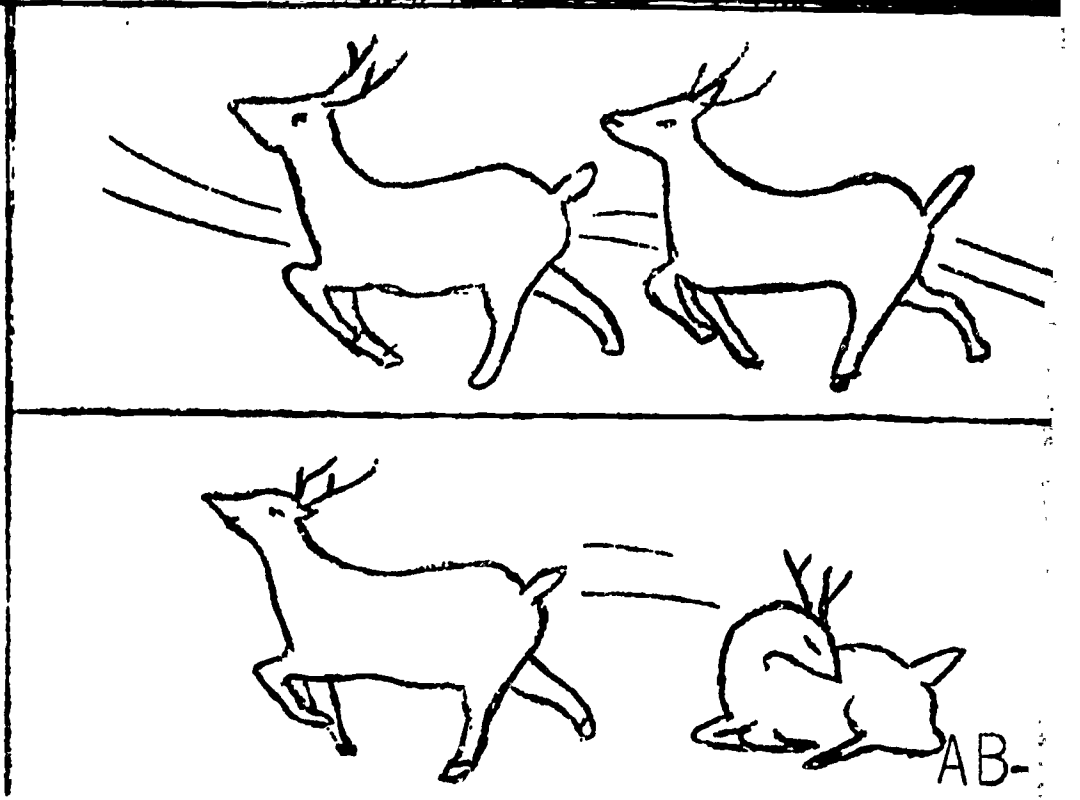
24.

The deer runs. 0

The deer rides Rags. 0

The deer is funny.0

The deer run. 0



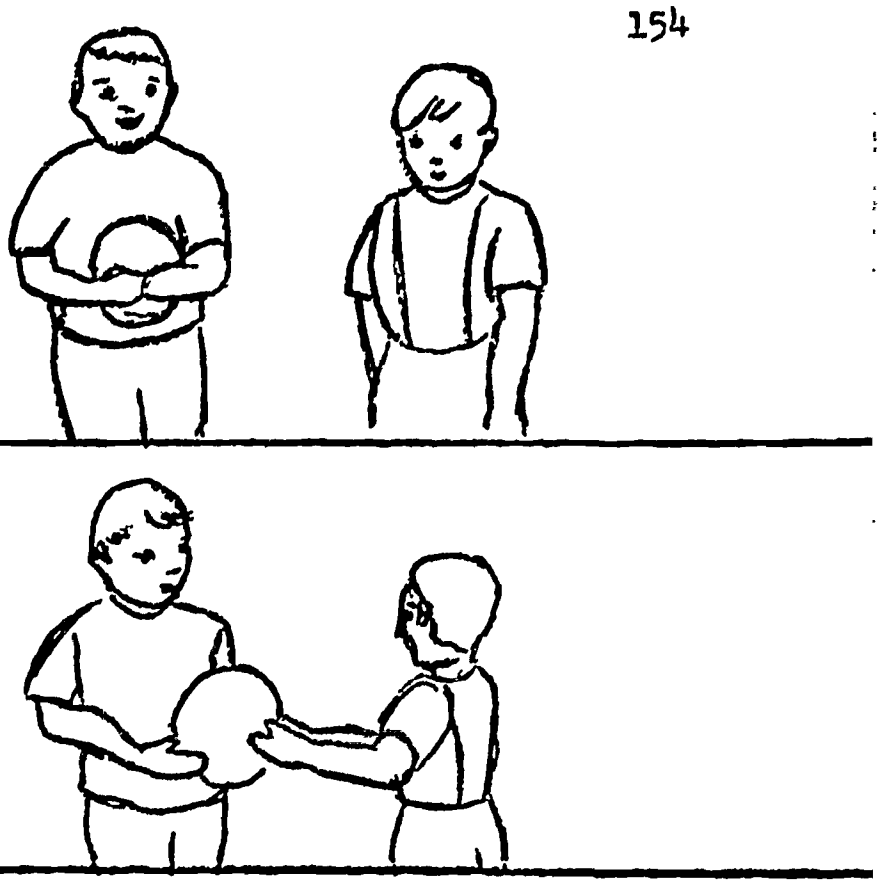
25.

Their ball. 0

His car. 0

His ball. 0

Their car. 0



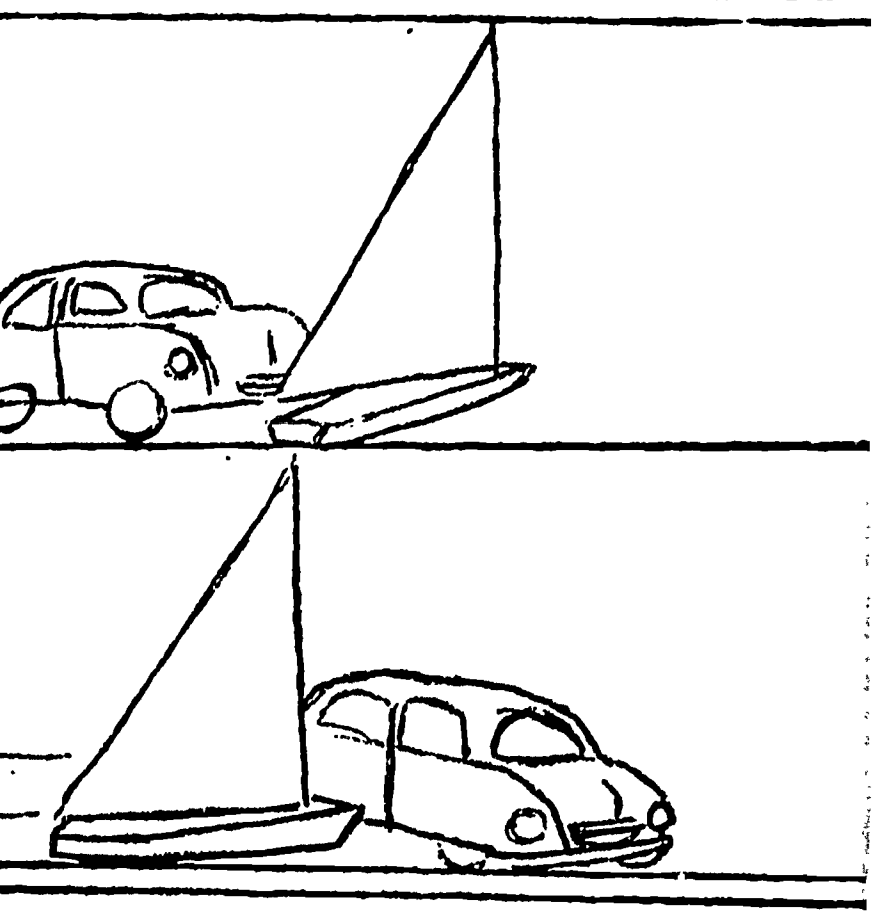
26.

The car goes fast.0

The car stops the boat. 0

The boat stops the car. 0

The boat runs away. 0



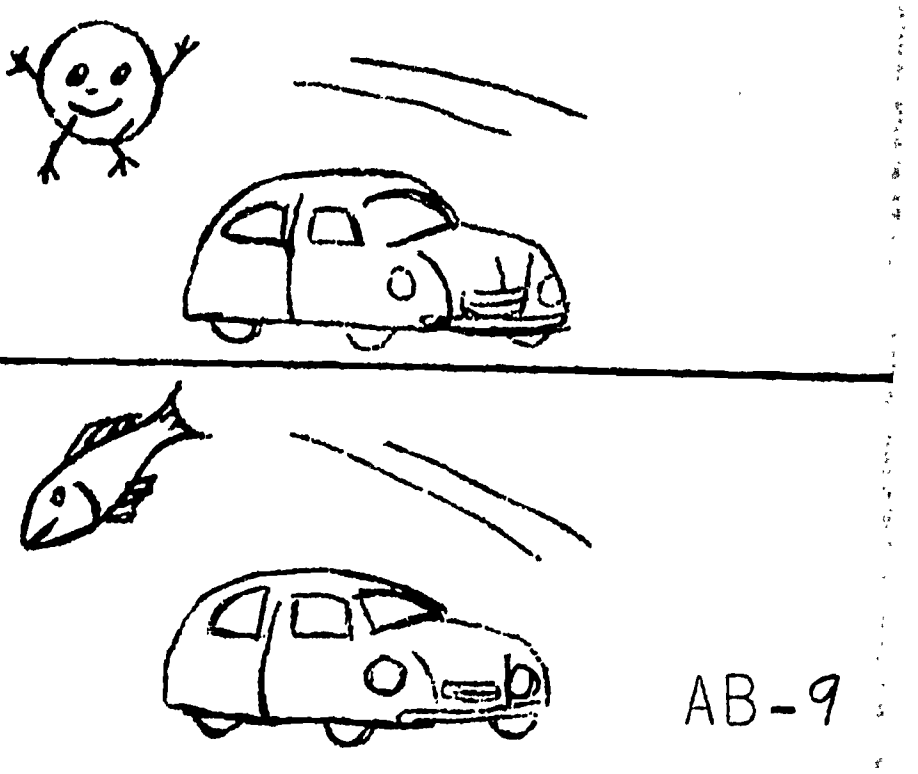
27.

The ball is green.0

The ball jumps. 0

The fish jumps. 0

The fish is funny. 0



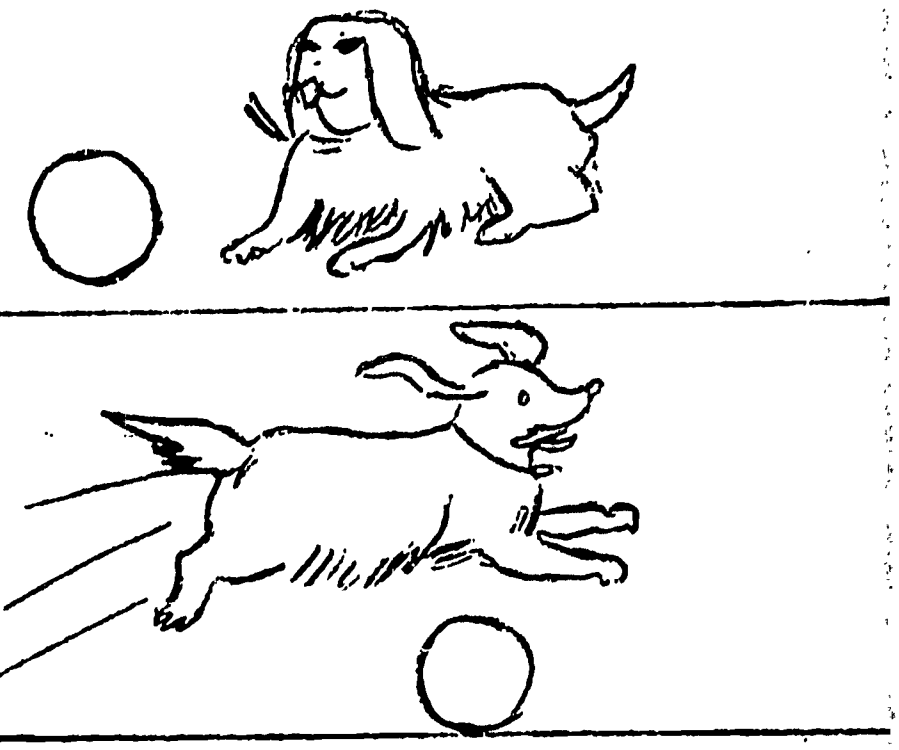
28.

Rags is playing. O

Rags gets
Midnight. O

Rags played. O

Rags helped Daddy.O



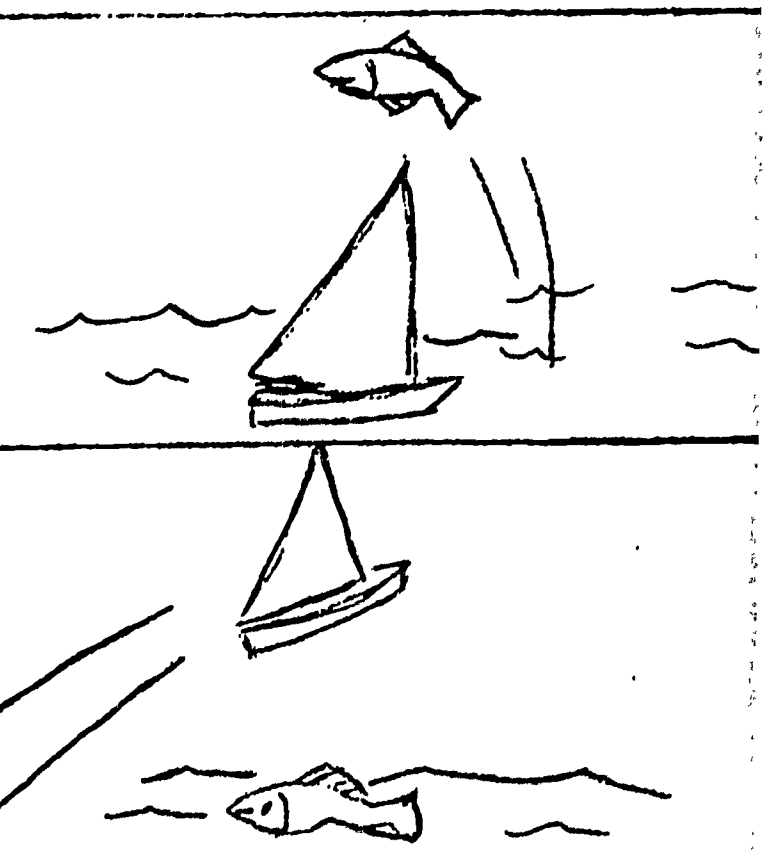
29.

The fish wants to
see the ball.O

The boat can go very
fast. O

The fish is jumped
by the boat. O

The boat is jumped
by the fish. O



30.

Linda is jumping.O

Linda comes home.O

Linda will jump. O

Linda helps Rags.O

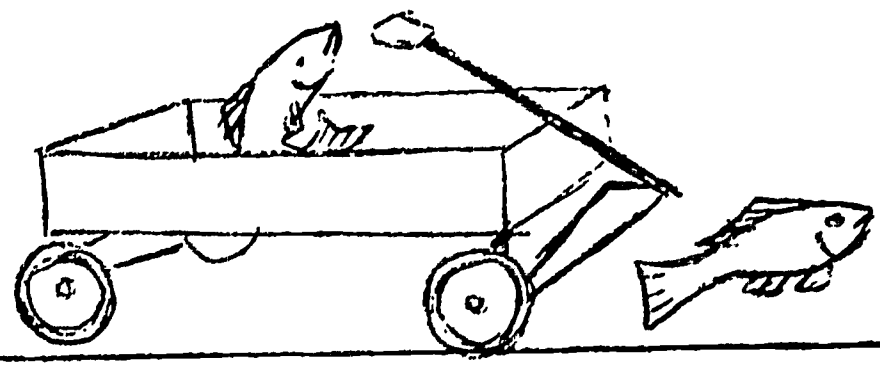
31.

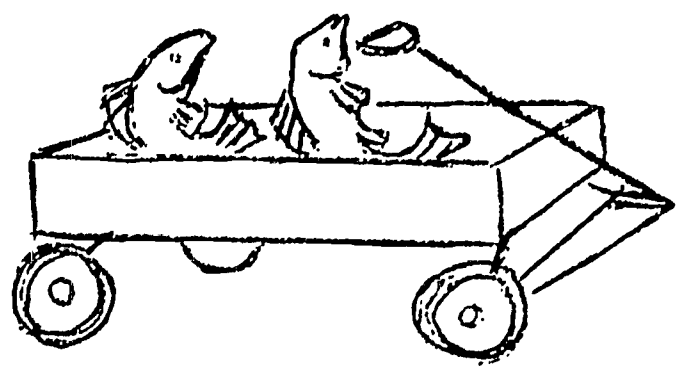
The fish is red. 0

The fish ride. 0

The fish makes cookies 0

The fish rides. 0





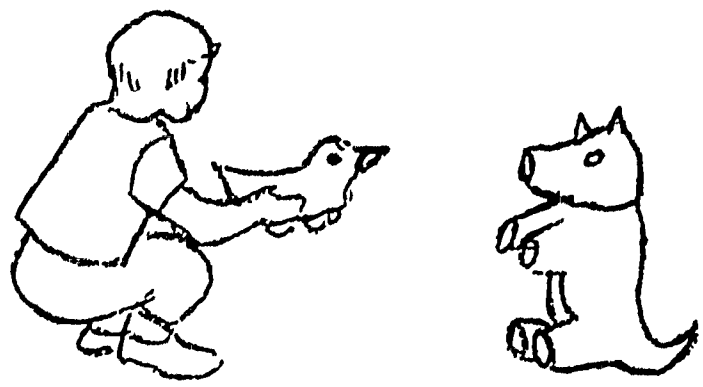
32.

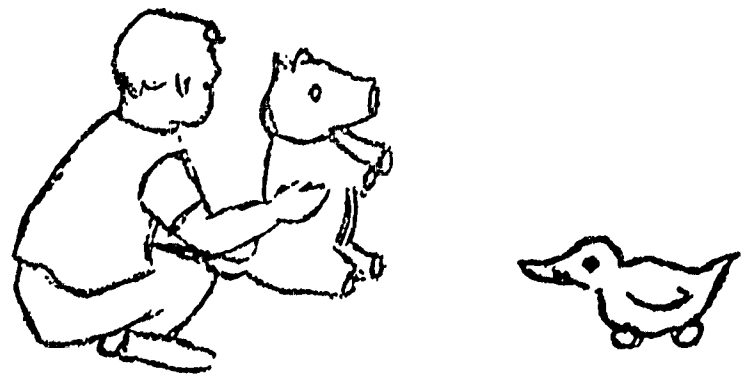
Bill gives the duck the dog. 0

Bill jumps and plays. 0

Bill gives the dog the duck. 0

Bill is fast and blue. 0





# 3. PRIMARY TEST OF SYNTAX

## P and P+ Treatments

Robert B. Ruddell
Associate Professor of Education
University of California

CHILD'S NAME_____

BIRTH DATE_____

TEACHER_____

SCHOOL_____

DATE_____

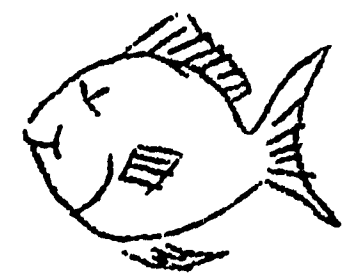
1.

The kitten. O

The fish. O

A can. O

A big can. O



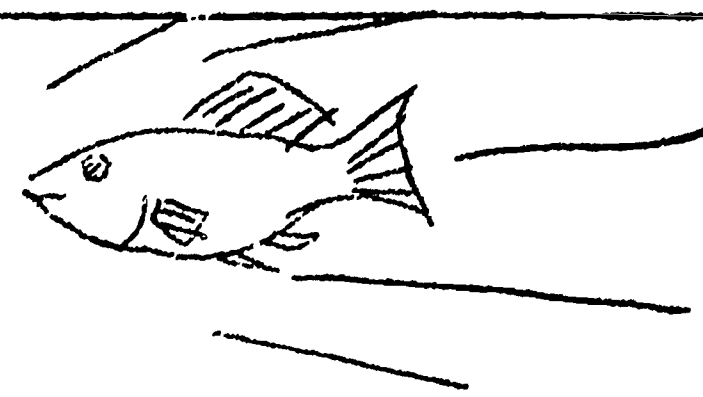
2.

The big kitten. O

It ran fast. O

A fast fish. O

It went up. O



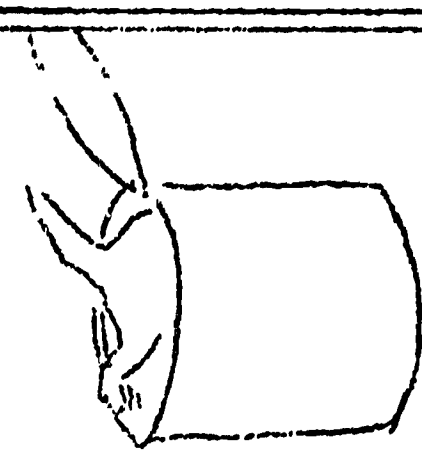
3.

The fast kitten is black. O

The kitten went in the can. O

A can ran to the kitten. O

The kitten ran to a can. O



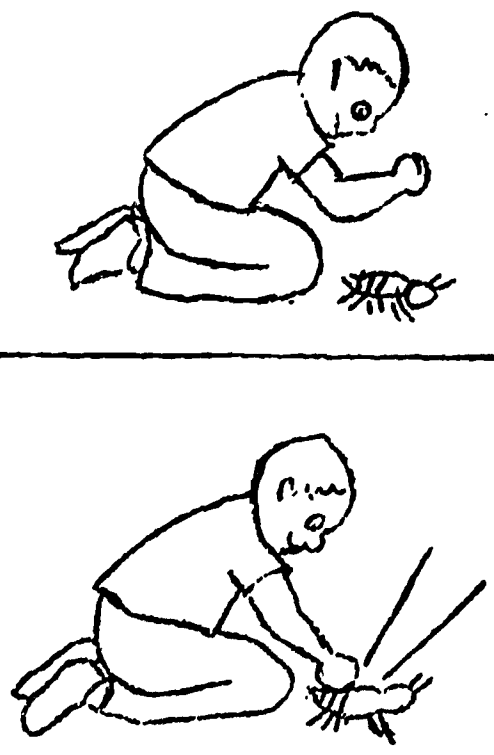
1.

Sam fills the glass. O

Sam is hitting. O

Sam catches Nip.O

Sam will hit.O





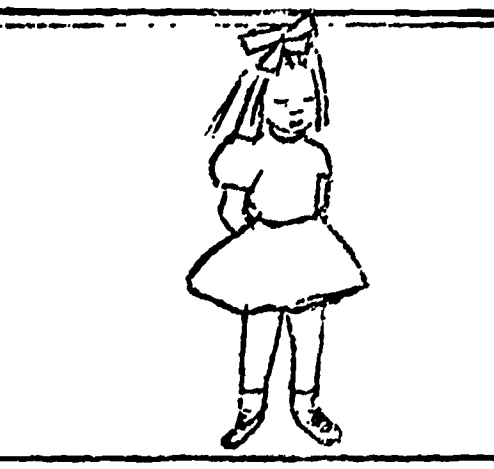
2.

Ann is not skipping. O

Ann trips Sam. O

Ann is skipping.O

Ann rips a dress.O



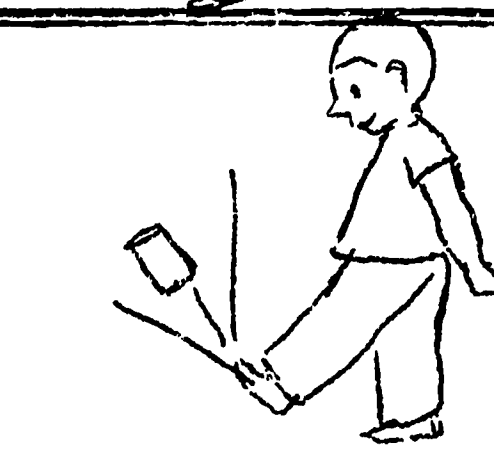
3.

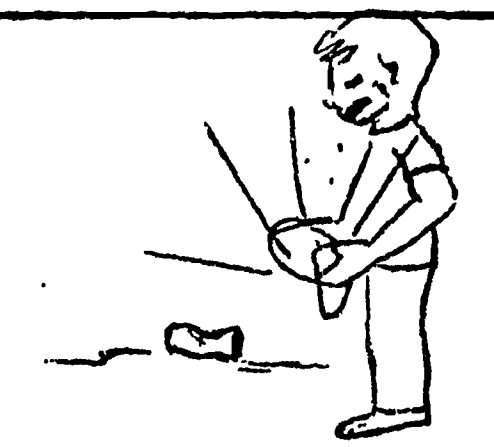
Sam hid the dress. O

Sam kicked. O

Sam fishes. O

Sam is kicking.O





MH

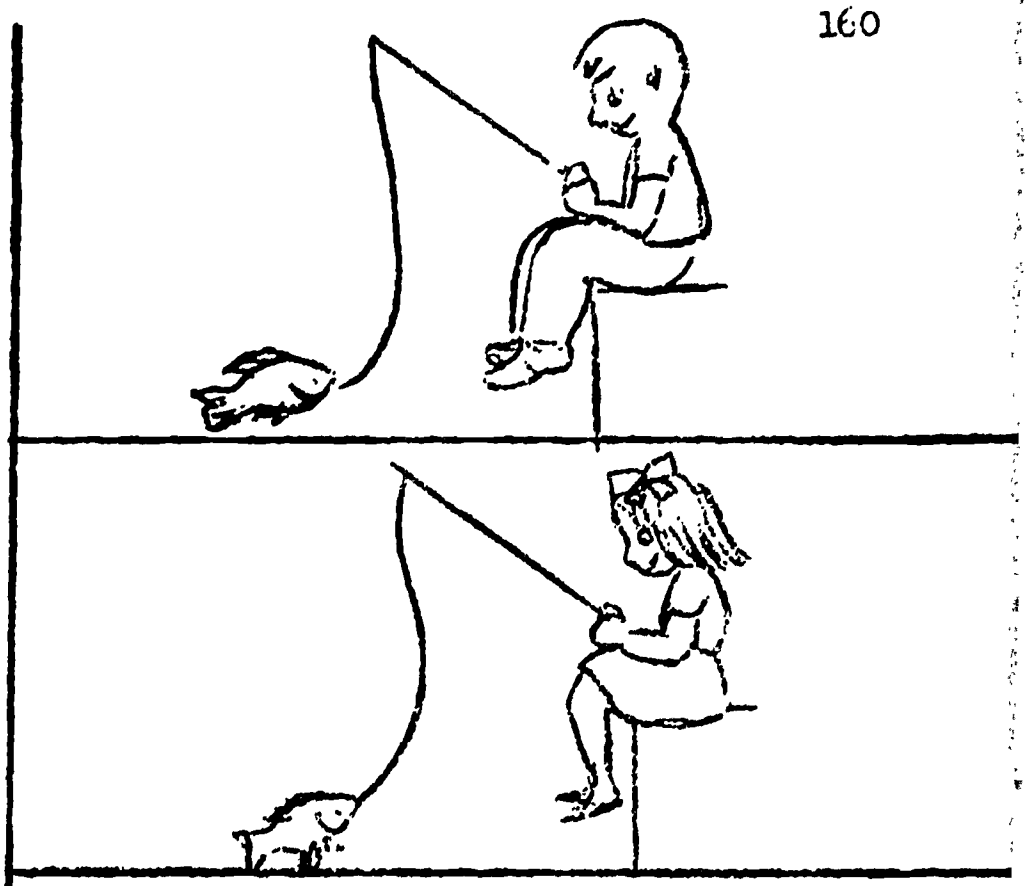
4.

Ann sniffs. 0

Ann fishes. 0

Sam fishes. 0

Sam drinks. 0



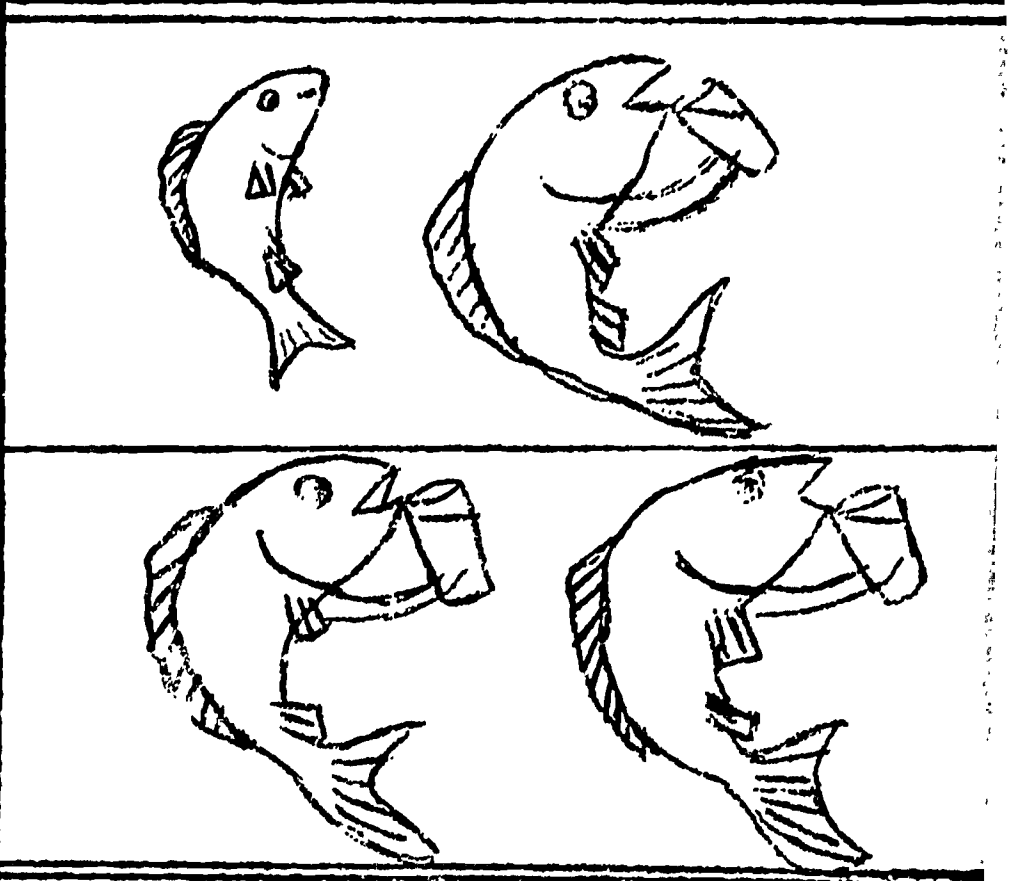
5.

The fish is drinking. 0

The fish digs sand. 0

The fish are drinking. 0

The fish sings best. 0



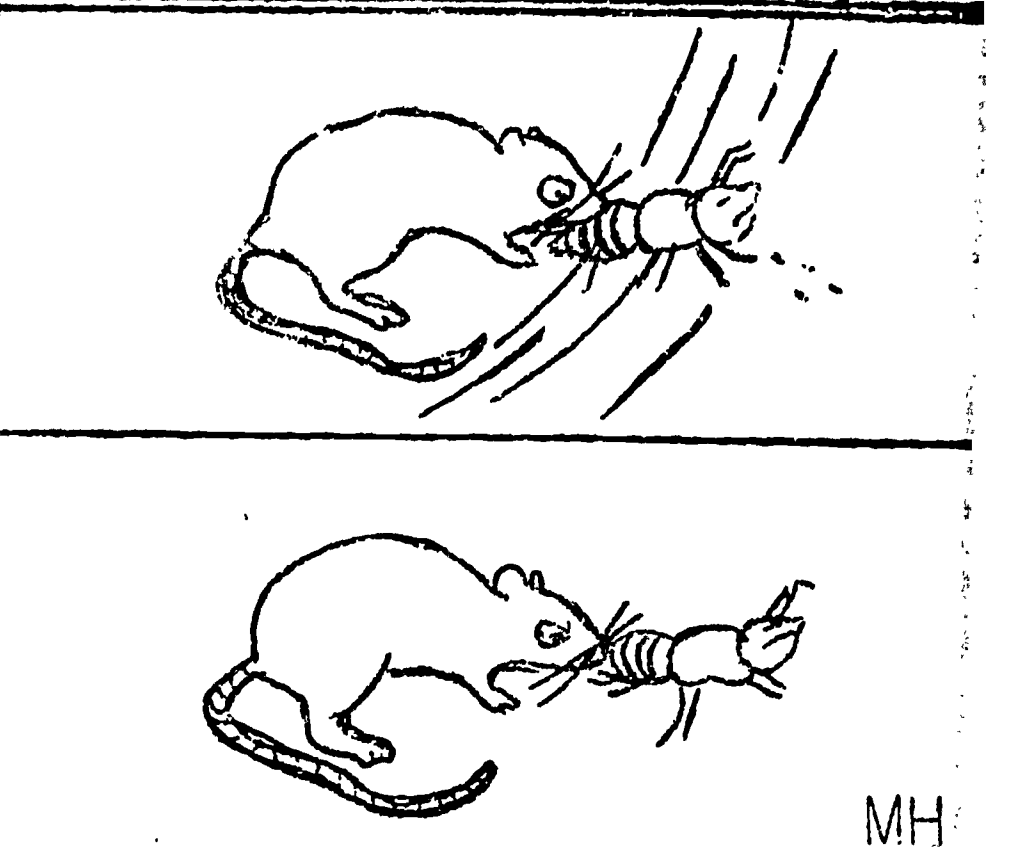
6.

The rat ran up the hill. 0

The rat is sitting on the ship. 0

The rat bites very easy. 0

The rat bites very hard. 0



MH

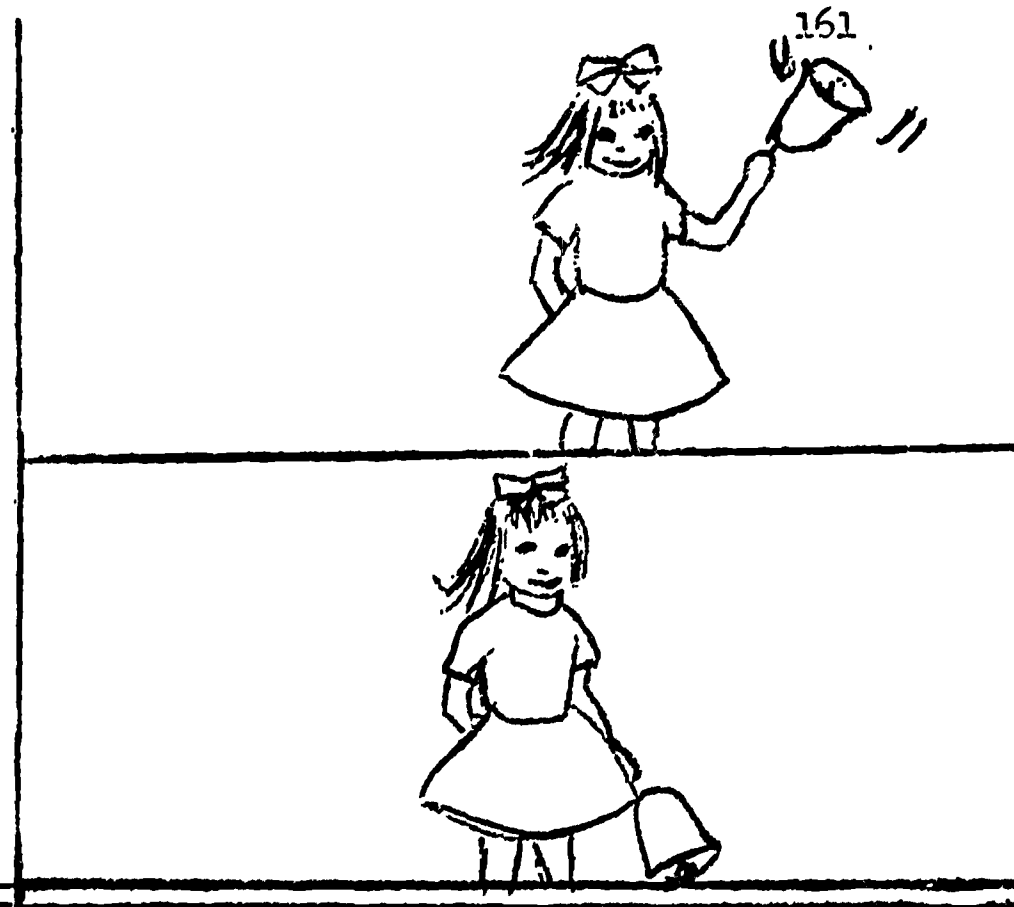
7.

Ann rings the bell. O

Ann ran fast. O

Ann is singing. O

Ann will ring the bell. O



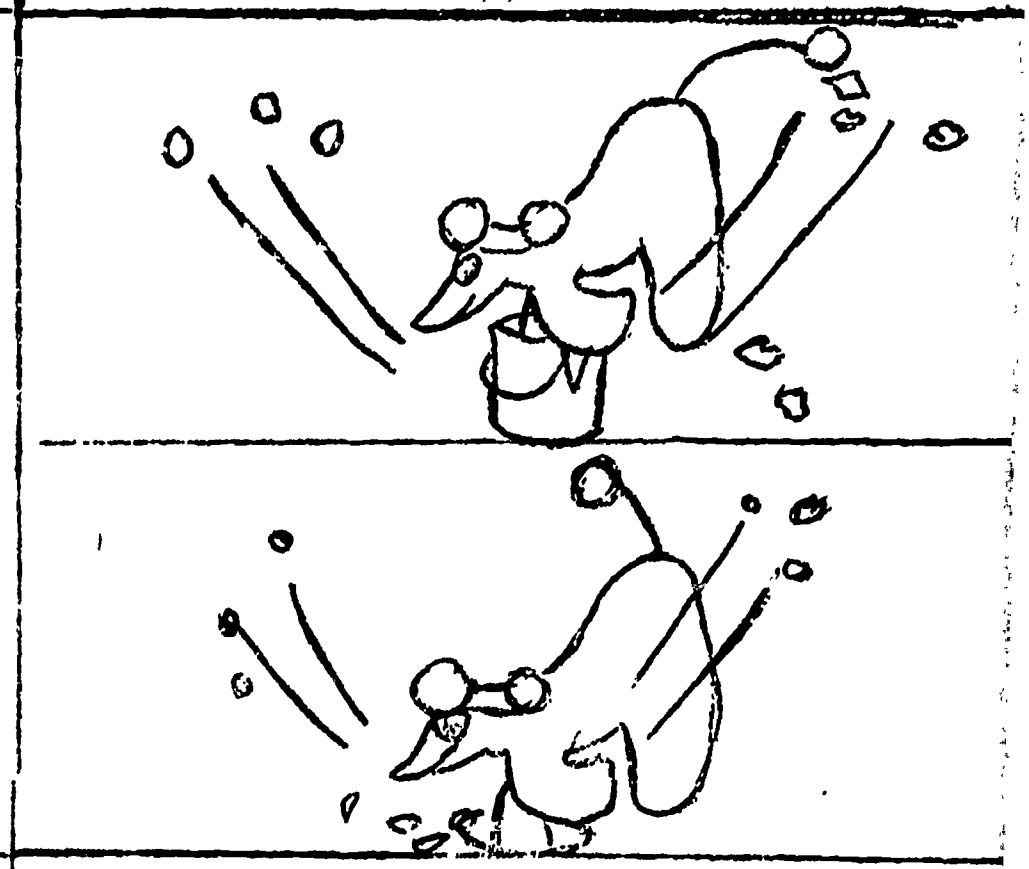
8.

Nip digs in the dirt. O

Nip went with the kitten. O

Nip bites the kitten. O

Nip digs in the bag. O



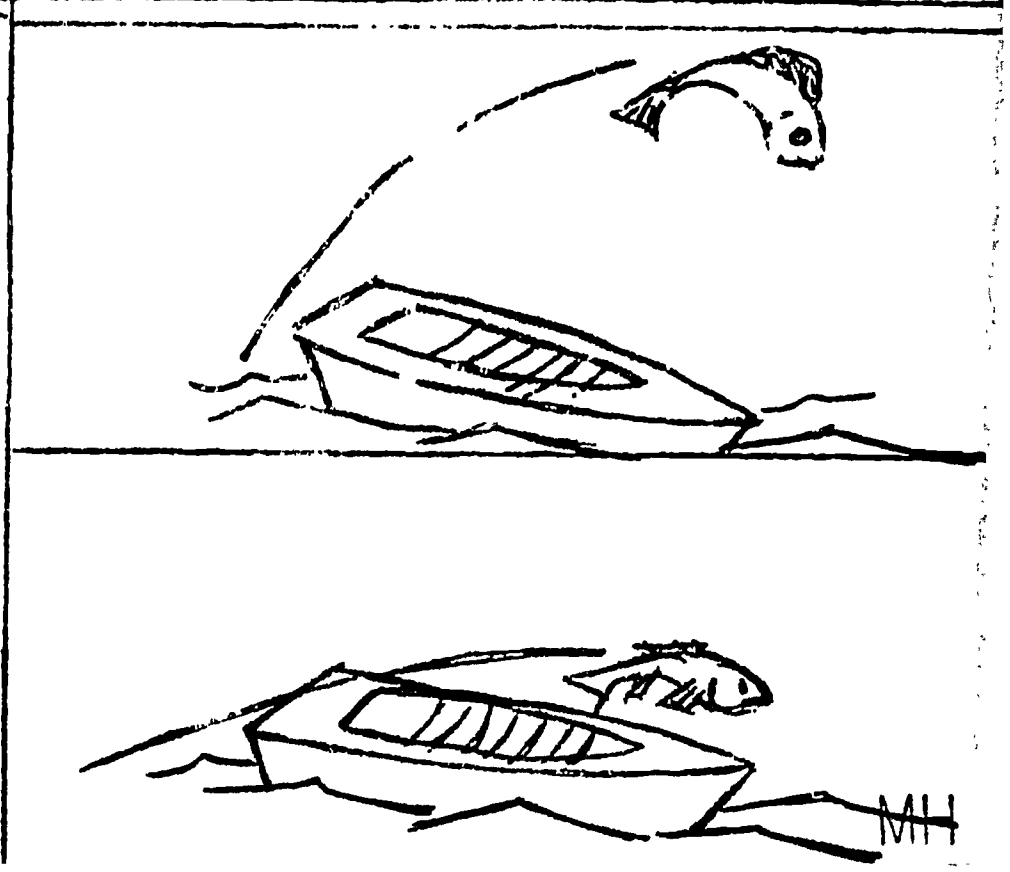
9.

The fish is red and pink. O

The fish snaps at the kitten. O

The fish jumps very low. O

The fish jumps very high. O



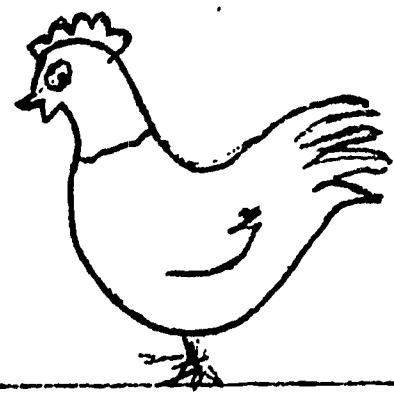
10.

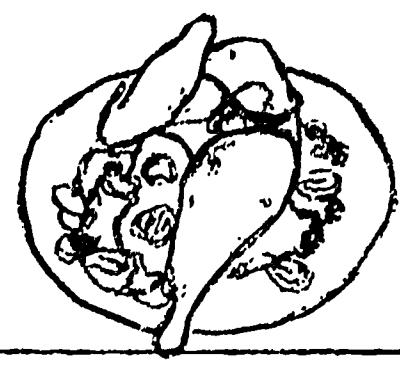
Some chicken. 0

A chicken. 0

A hat. 0

Ann's pig. 0





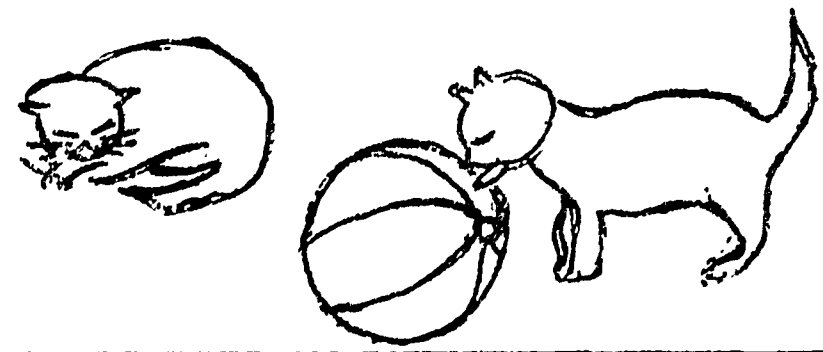
11.

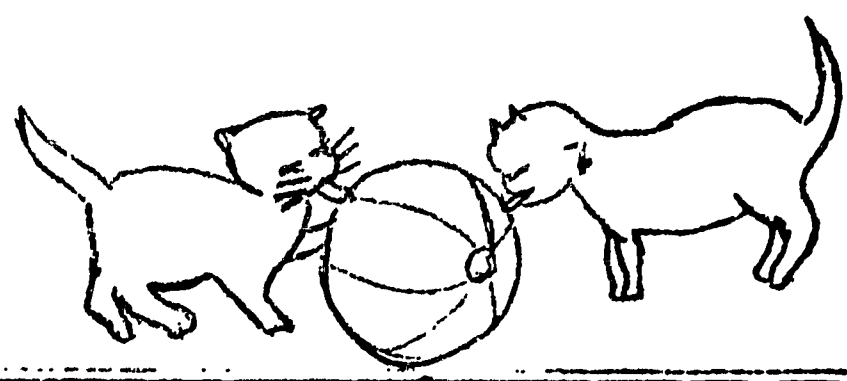
The kitten is pink. 0

The kitten licks.0

The kitten is fast. 0

The kittens lick.0





12.

Ann pats the chicken. 0

Sam is tripped by Ann. 0

Ann is tripped by Sam. 0

Sam brings the kitten. 0

MH

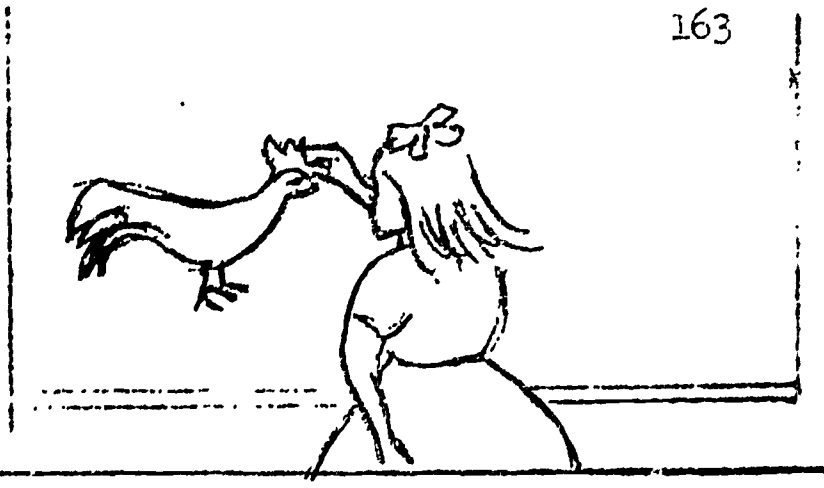
13.

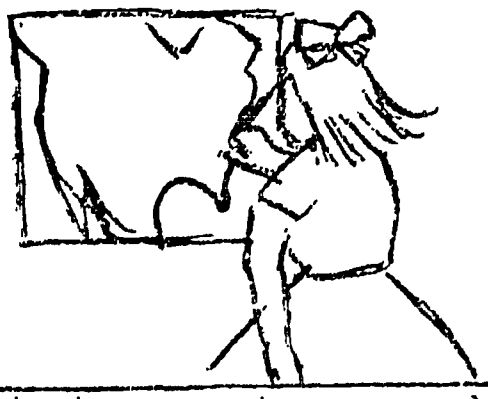
Ann is skipping and singing. 0

Ann draws on the map. 0

Ann hits Nip and Tab. 0

Ann draws on the board. 0





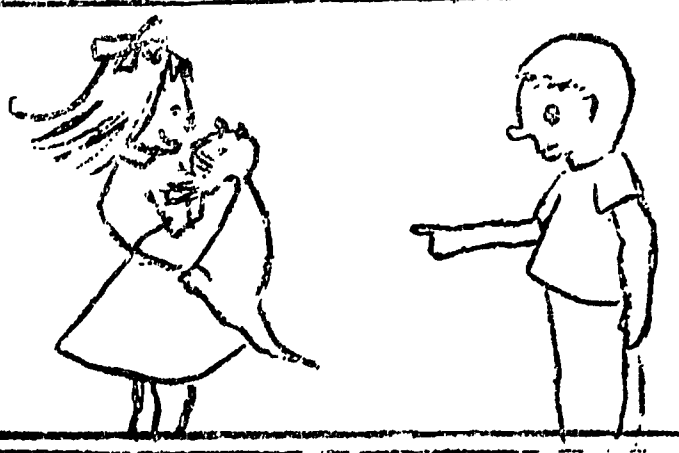
14.

Her cat. 0

Their pin. 0

Her pin. 0

Their cat. 0



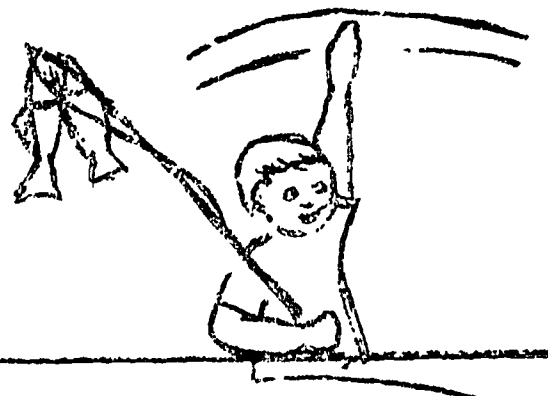
15.

Sam waves before fishing. 0

Sam sang to Ann. 0

Sam is fast. 0

Sam waves after fishing. 0



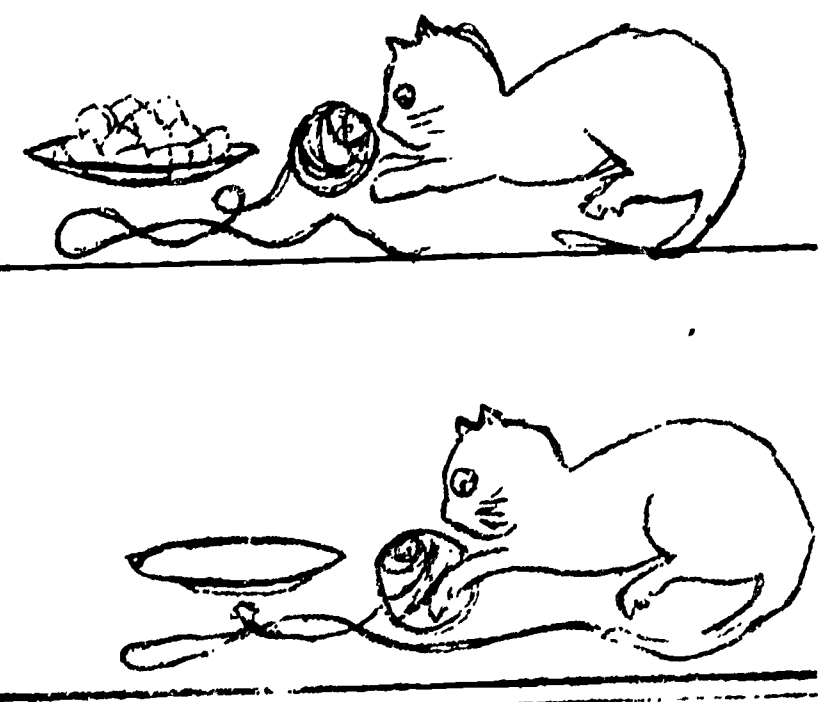
16.

Tab played after dinner. 0

Tab spills the milk. 0

Tab bit Sam. 0

Tab played before dinner. 0



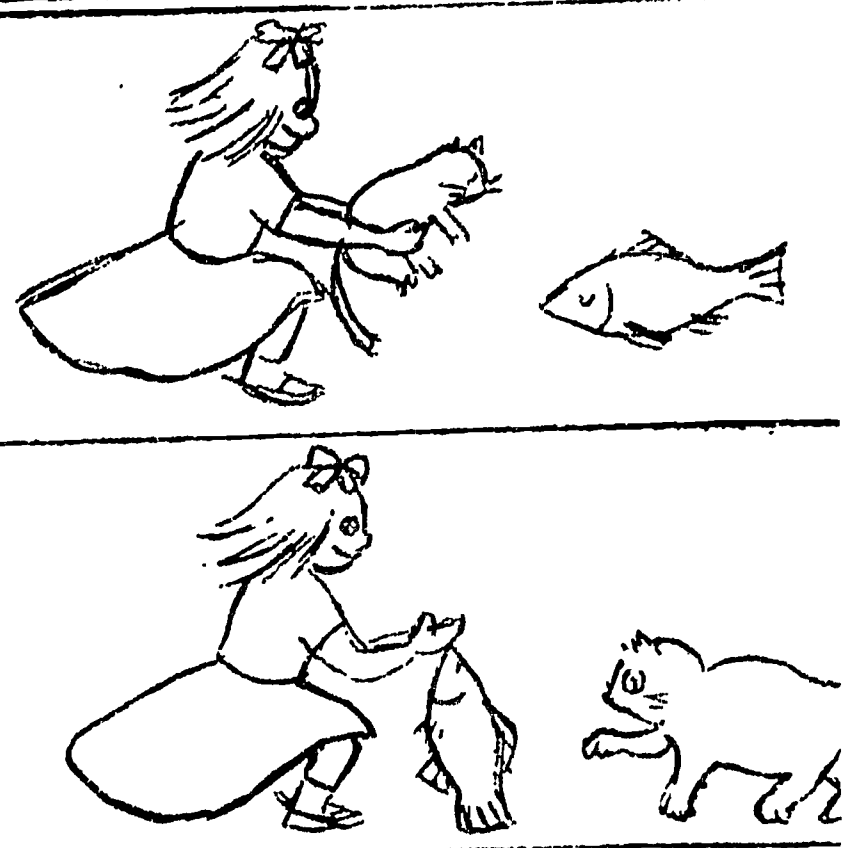
17.

Ann fell in the grass. 0

Ann brings the fish the kitten. 0

Ann hid the hat from Sam. 0

Ann brings the kitten the fish.0



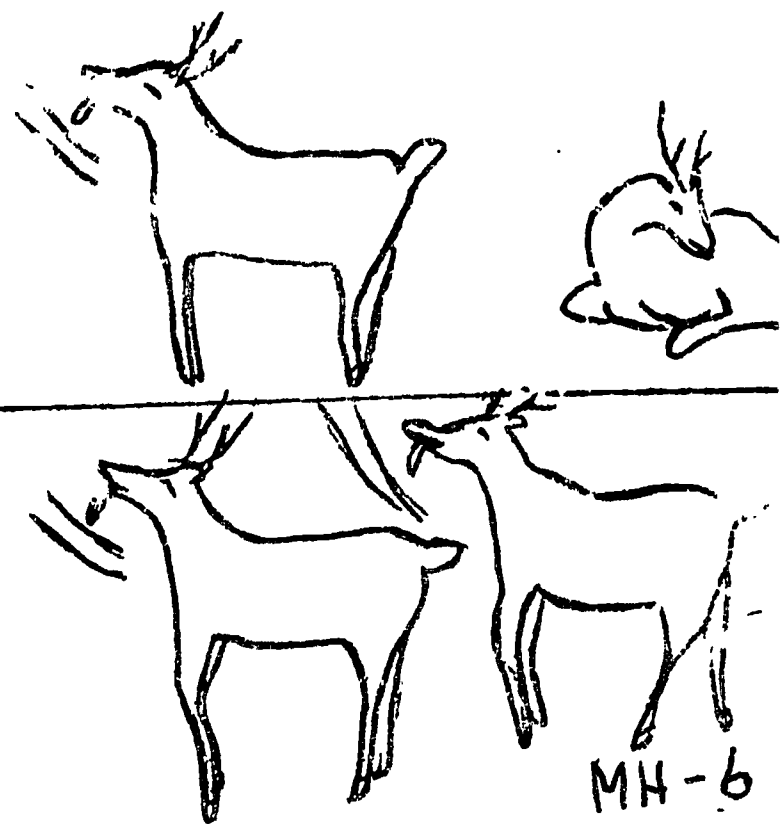
18.

The deer is panting. 0

The deer are panting. 0

The deer rang the bell. 0

The deer licks the kitten. 0



MH-6

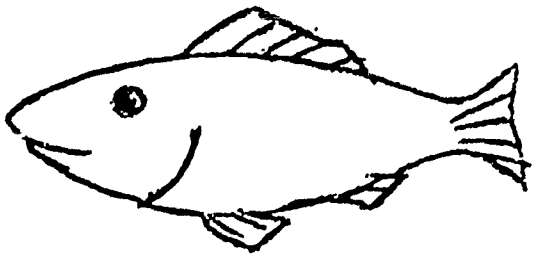
19.

Sad cat. 0

Fat man. 0

Some fish. 0

A fish. 0



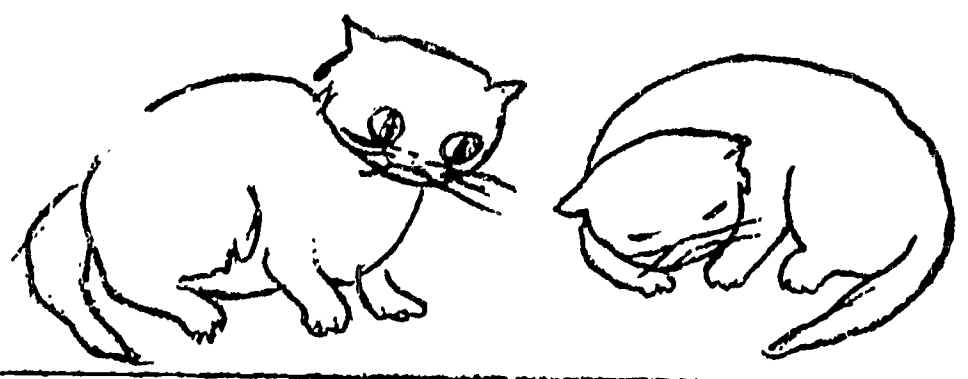
20.

The cat fishes. 0

The cat naps. 0

The cats nap. 0

The cat is thin. 0



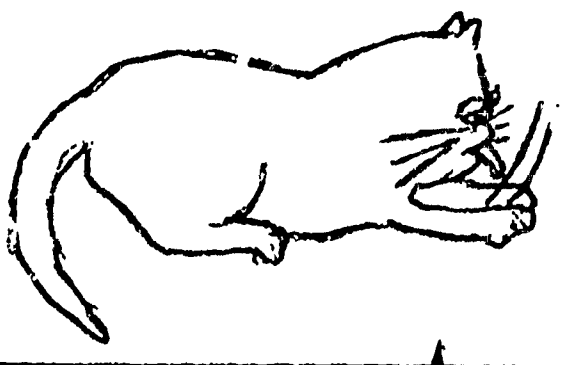
21.

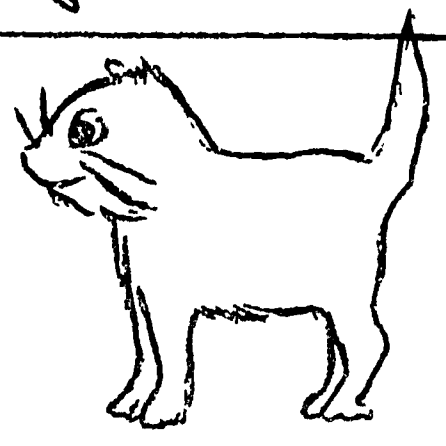
Tab is red. 0

Tab is not
panting. 0

Tab is panting. 0

Tab went crash. 0





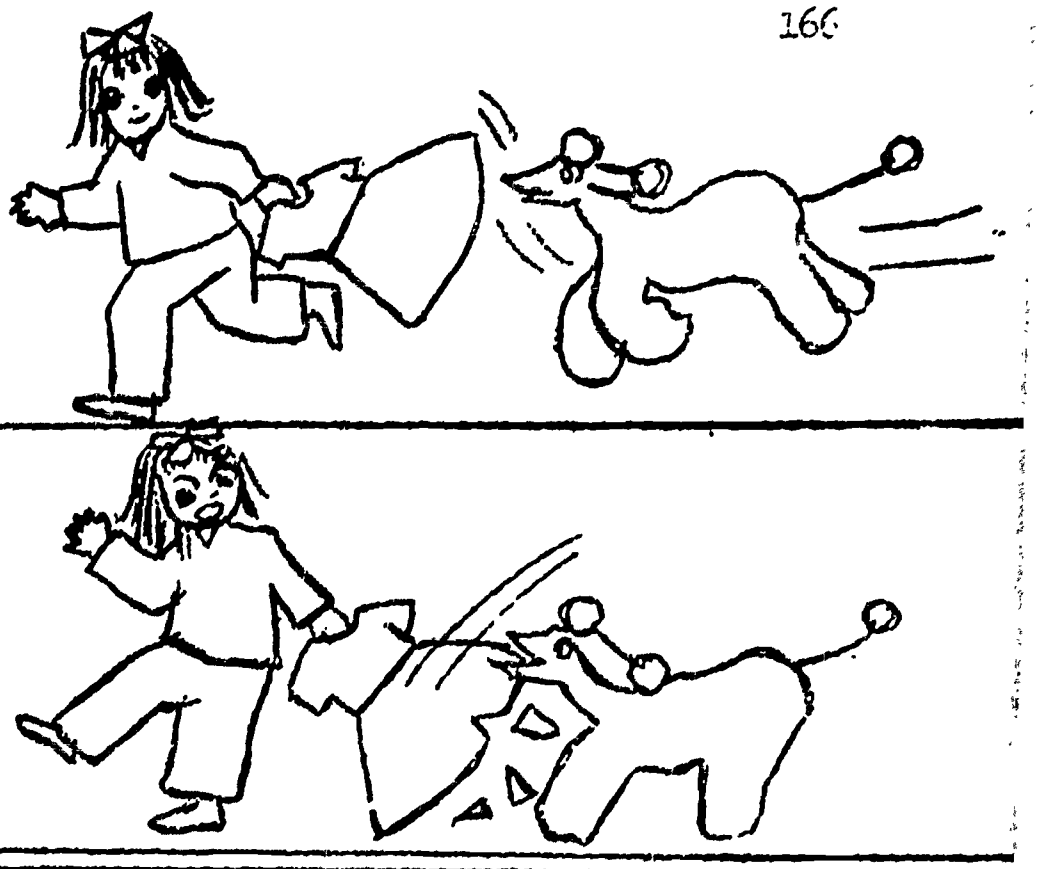
22.

Nip sat on the hat. O

Nip will rip the dress. O

Nip licks Tab. O

Nip rips the dress. O



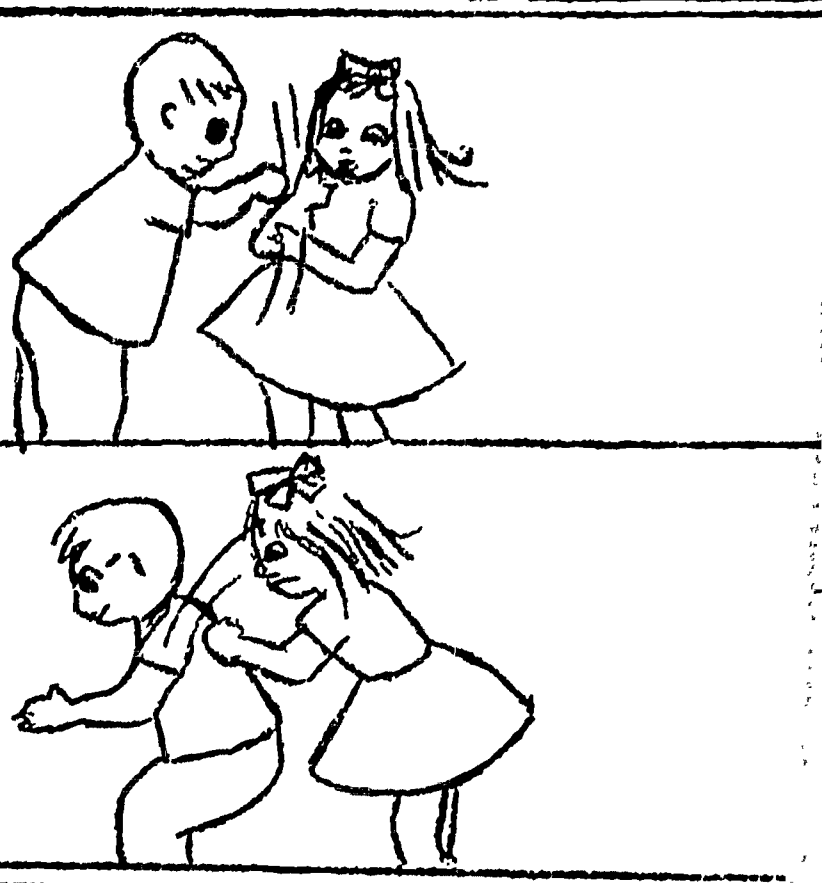
23.

Ann hits Sam. O

Sam hits Ann. O

Sam rings the bell. O

Ann kicks the bed. O



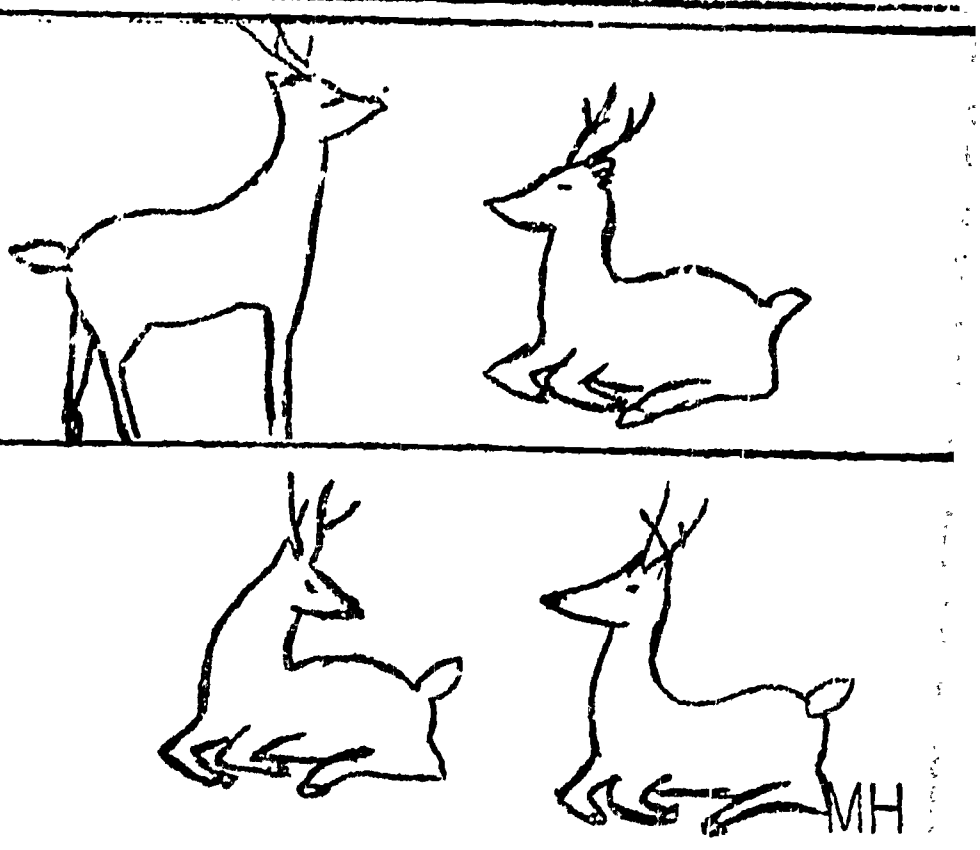
24.

The deer is singing. O

The deer sits. O

The deer bit Tab. O

The deer sit. O



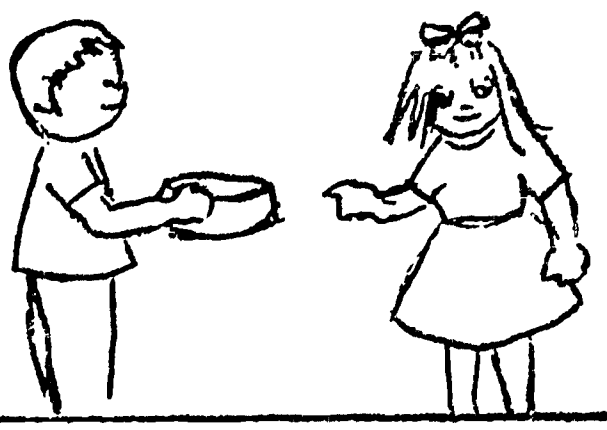
25.

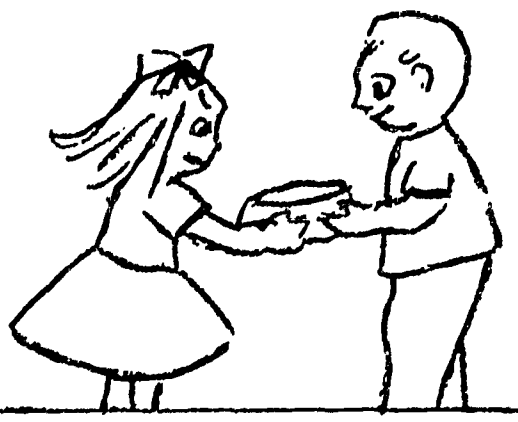
Their dish. 0

His bag. 0

Their bag. 0

His dish. 0





26.

The rat ran fast.0

The rat bit the cat. 0

The cat bit the rat. 0

The cat ripped the bag. 0

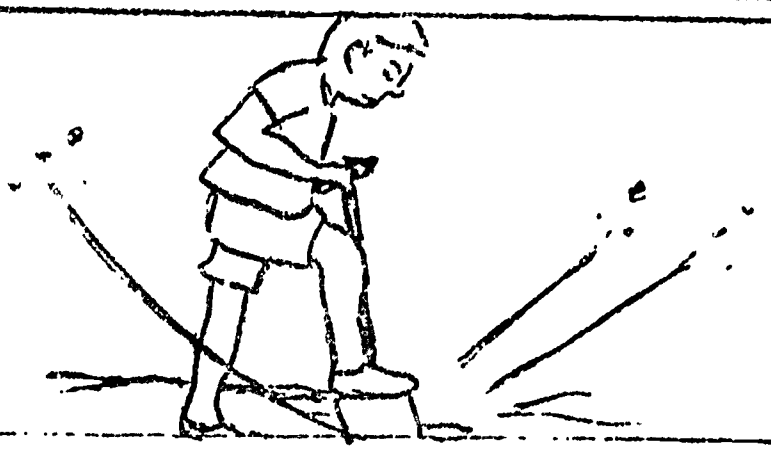
27.

The man tripped. 0

The man digs. 0

The pig digs. 0

The pig ran fast.0



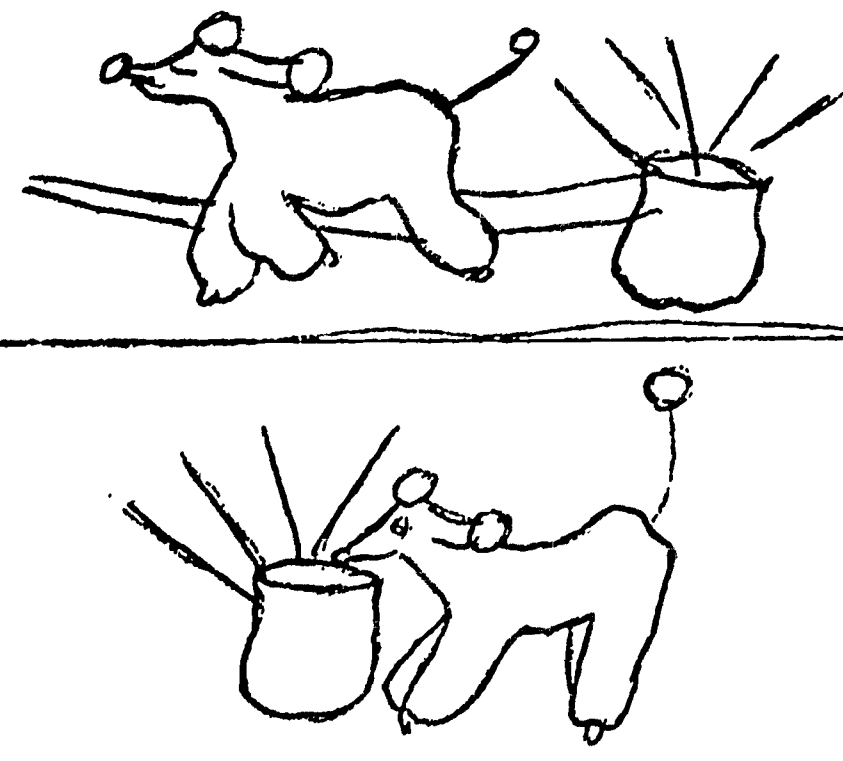
28.

Nip catches Tab. O

Nip sniffed. O

Nip bit the man. O

Nip is sniffing. O



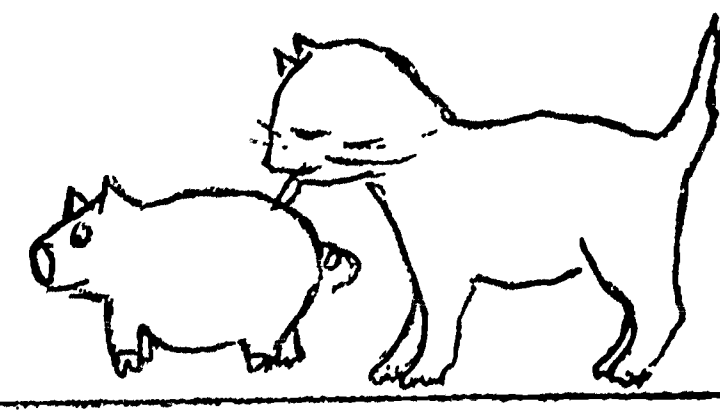
29.

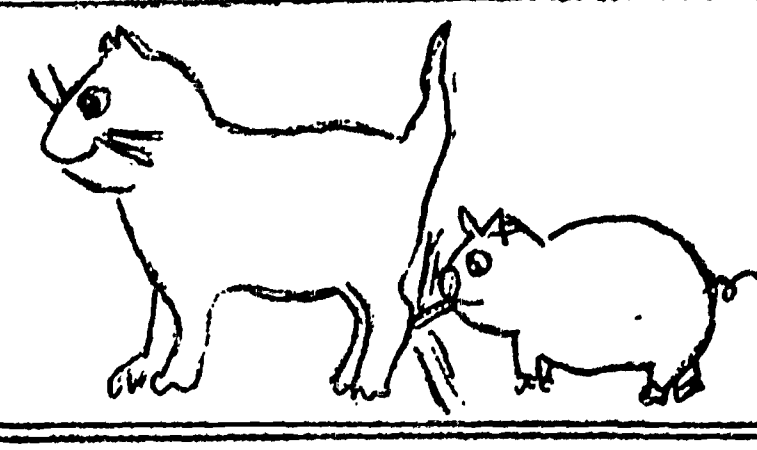
The cat fills the glass. O

The pig is licked by the cat. O

The pig ran up the hill. O

The cat is licked by the pig. O





30.

Ann sits. O

Ann will drink. O

Ann is drinking. O

Ann skips fast. O

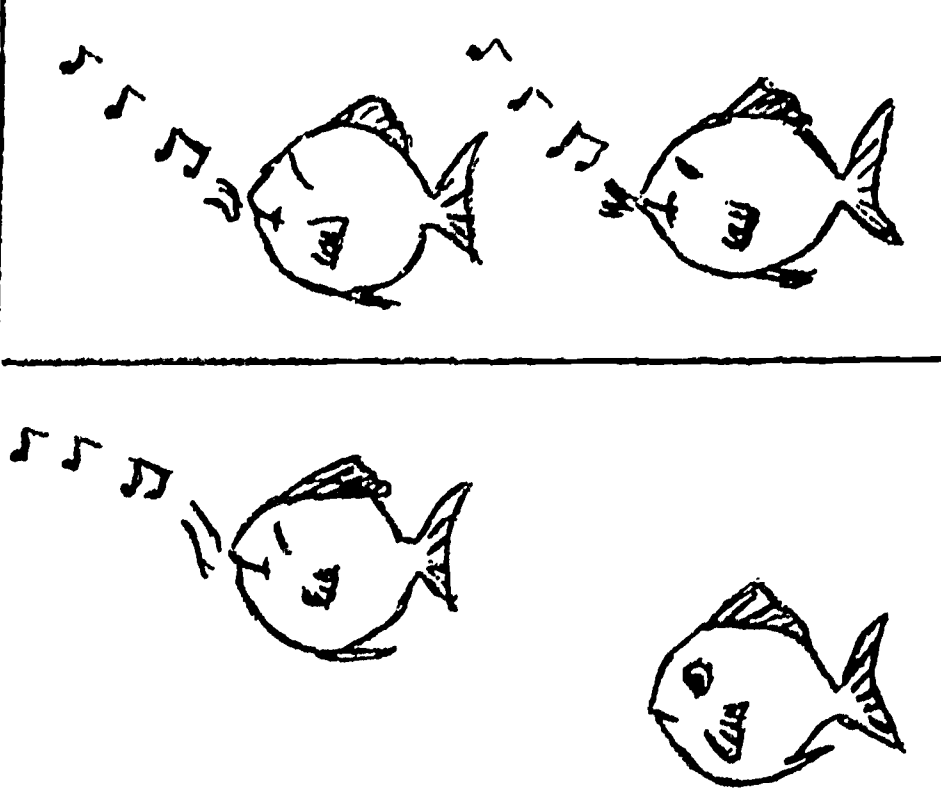
31.

The fish sings. O

The fish hits Ann. O

The fish sing. O

The fish is red. O



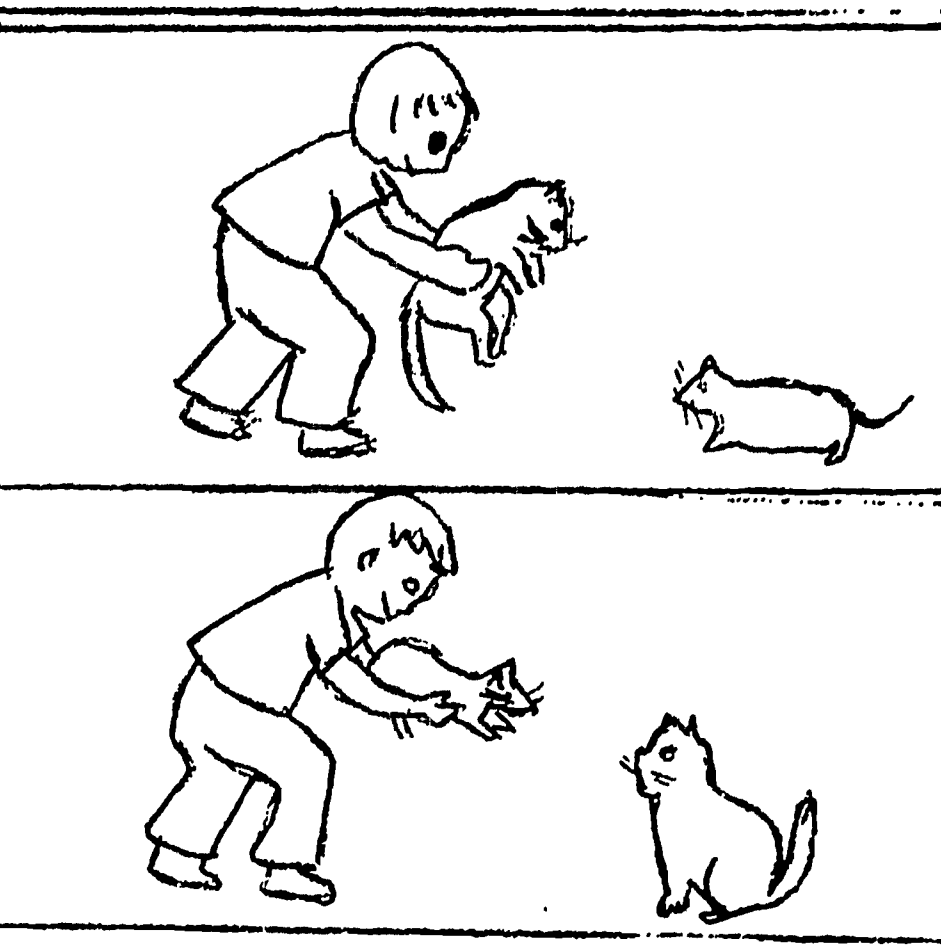
32.

Sam sings and pants. O

Sam gives the rat the cat. O

Sam is sick and red. O

Sam gives the cat the rat. O



# APPENDIX C

1. PHONETICALLY REGULAR WORDS ORAL READING TEST--CRITERION MEASURE FOR REGULAR WORD IDENTIFICATION VARIABLE

2. GATES WORD PRONUNCIATION TEST--CRITERION MEASURE FOR IRREGULAR WORD IDENTIFICATION VARIABLE

# 1. PHONETICALLY REGULAR WORDS ORAL READING TEST

Child's Name_____ Date_____

School_____ Room_____ Code Number_____

Examiner_____ Number of words read correctly___

| | |
|---|---|
| 1. nap | 16. walk |
| 2. pen | 17. haul |
| 3. hid | 18. jaw |
| 4. job | 19. soil |
| 5. rug | 20. joy |
| 6. shade | 21. frown |
| 7. drive | 22. trout |
| 8. joke | 23. term |
| 9. mule | 24. curl |
| 10. plain | 25. birch |
| 11. hay | 26. rare |
| 12. keen | 27. star |
| 13. least | 28. porch |
| 14. loan | 29. smooth |
| 15. show | 30. shook |

Directions: Have pupil read words from one copy while examiner makes another copy. Do not give pupil a second chance but accept immediate self-correction. Let every student try the whole first column. If he gets two words correct from word number six on, let him try the whole second column.

## 2. GATES WORD PRONUNCIATION TEST

| | | | |
|---|---|---|---|
| 1. | so | 21. | passenger |
| 2. | we | 22. | wander |
| 3. | as | 23. | interest |
| 4. | go | 24. | chocolate |
| 5. | the | 25. | dispute |
| 6. | not | 26. | portion |
| 7. | how | 27. | conductor |
| 8. | may | 28. | brightness |
| 9. | king | 29. | intelligent |
| 10. | here | 30. | construct |
| 11. | grow | 31. | position |
| 12. | late | 32. | profitable |
| 13. | every | 33. | irregular |
| 14. | about | 34. | schoolmaster |
| 15. | paper | 35. | lamentation |
| 16. | blind | 36. | community |
| 17. | window | 37. | satisfactory |
| 18. | family | 38. | illustrious |
| 19. | perhaps | 39. | superstition |
| 20. | plaster | 40. | affectionate |

# APPENDIX D

## SYNTAX RECORD--USED TO RECORD ORAL LANGUAGE RESPONSES OF CHILDREN: FORMS A AND B

Form 10/20/65, 66 **SYNTAX RECORD--FORM A**

Date_____

Time Stopped_____

Examiner's Name_____ Time Started_____

Total Time_____

Child's Name_____ School_____ Teacher_____

| | |
|---|---|
| _____1. A string | Some string |
| _____2. A paper | Some paper |
| _____3. The boy draws. | The boys draw. |
| _____4. The dog digs. | The dogs dig. |
| _____5. The deer runs. | The deer run. |
| _____6. The sheep jumps. | The sheep jump. |
| _____7. The sheep are eating. | The sheep is eating. |
| _____8. The deer is sitting. | The deer are sitting. |
| _____9. The paint spilled. | The paint is spilling. |
| _____10. The boy is jumping. | The boy jumped. |
| _____11. The girl is drinking. | The girl will drink. |
| _____12. The baby is climbing. | The baby will climb. |
| _____13. The girl is not cooking. | The girl is cooking. |
| _____14. The match is burning. | The match is not burning. |
| _____15. The duck pulls the boat. | The boat pulls the duck. |
| _____16. The girl washes the boy. | The boy washes the girl. |
| _____17. The train is bumped by the car. | The car is bumped by the train. |
| _____18. The Mommy is kissed by the Daddy. | The Daddy is kissed by the Mommy. |

SYNTAX RECORD--FORM A, Page 2

| | | |
|---|---|---|
| _____19. | The girl shows the rabbit the bear. | The girl shows the bear the rabbit. |
| _____20. | The boy brings the bird the fish. | The boy brings the fish the bird. |
| _____21. | Their wagon | His wagon |
| _____22. | Their dog | Her dog |
| _____23. | The cat chases the dog. | The dog chases the cat. |
| _____24. | The boy feeds the girl. | The girl feeds the boy. |
| _____25. | The dog bites. | The cat bites. |
| _____26. | The boy pushes. | The girl pushes. |
| _____27. | The girl waves. | The girls wave. |
| _____28. | The kittens play. | The kitten plays. |
| _____29. | The boys pull the boat. | The boy pulls the boat. |
| _____30. | The girl rides the horse. | The girls ride the horse. |
| _____31. | will sweep the floor | sweeps the floor |
| _____32. | holds the hammer | will hold the hammer |
| _____33. | The boy throws the bear. | The boy throws the dolly. |
| _____34. | The girl holds the dog. | The girl holds the cat. |

Form 10/20/65,66 SYNTAX RECORD--FORM B

Date_____

Time Stopped_____

Examiner's Name_____ Time Started_____

Total Time_____

Child's Name_____ School_____ Teacher_____

| | | |
|---|---|---|
| _____1. | A string | Some string |
| _____2. | A paper | Some paper |
| _____3. | The boys draw on the board. | The boy draws on the paper. |
| _____4. | The dog digs in the dirt. | The dogs dig in the water. |
| _____5. | The deer runs into the woods. | The deer run into the bar. |
| _____6. | The sheep jumps over the fence. | The sheep jump over the water. |
| _____7. | The sheep are eating. | The sheep is eating. |
| _____8. | The deer is sitting. | The deer are sitting. |
| _____9. | The paint spilled on the floor. | The paint is spilling on the truck. |
| _____10. | The boy is jumping over the truck. | The boy jumped over the box. |
| _____11. | The girl is drinking the water. | The girl will drink the pop. |
| _____12. | The baby is climbing the steps. | The baby will climb the hill. |
| _____13. | The girl is not cooking. | The girl is cooking. |
| _____14. | The match is burning. | The match is not burning. |
| _____15. | The duck pulls the boat in the water. | The boat pulls the duck in the rain. |

SYNTAX RECORD--FORM B, Page 2

| | | |
|---|---|---|
| ____16. | The girl washes the boy on the neck. | The boy washes the girl on the nose. |
| ____17. | The train is bumped by the car. | The car is bumped by the train. |
| ____18. | The Mommy is kissed by the Daddy. | The Daddy is kissed by the Mommy. |
| ____19. | The girl shows the rabbit the bear. | The girl shows the bear the rabbit. |
| ____20. | The boy brings the bird the fish. | The boy brings the fish the bird. |
| ____21. | Their wagon is blue. | His wagon is red. |
| ____22. | Their dog is red. | Her dog is brown. |
| ____23. | The cat chases the dog very fast. | The dog chases the cat very slowly. |
| ____24. | The boy feeds the girl very fast. | The girl feeds the boy very slowly. |
| ____25. | The dog bites very hard. | The cat bites very easily. |
| ____26. | The boy pushes very hard. | The girl pushes very easily. |
| ____27. | The girl waves after school. | The girls wave before school. |
| ____28. | The kittens play after dinner. | The kitten plays before dinner. |
| ____29. | Before school the boys pull the boat. | After school the boy pulls the boat. |
| ____30. | After the storm the girl rides the horse. | Before the storm the girls ride the horse. |
| ____31. | will sweep the floor | sweeps the floor |
| ____32. | holds the hammer | will hold the hammer |
| ____33. | The boy throws the bear. | The boy throws the dolly. |
| ____34. | The girl holds the dog. | The girl holds the cat. |

# APPENDIX E

## MORPHOLOGY RECORD--USED TO RECORD ORAL LANGUAGE RESPONSES OF CHILDREN

# MORPHOLOGY RECORD

Date_____

Time Stopped_____

Examiner's Name_____ Time Started_____

Total Time_____

Child's Name_____ School_____ Teacher_____

| | | |
|---|---|---|
| 1._____ | 16._____ | 31._____ |
| 2._____ | 17._____ | 32._____ |
| 3._____ | 18._____ | 33._____ |
| 4._____ | 19._____ | 34._____ |
| 5._____ | 20._____ | 35._____ |
| 6._____ | 21._____ | 36._____ |
| 7._____ | 22._____ | 37._____ |
| 8._____ | 23._____ | 38._____ |
| 9._____ | 24._____ | 39._____ |
| 10._____ | 25._____ | 40._____ |
| 11._____ | 26._____ | 41._____ |
| 12._____ | 27._____ | 42._____ |
| 13._____ | 28._____ | 43._____ |
| 14._____ | 29._____ | 44._____ |
| 15._____ | 30._____ | 45._____ |

# APPENDIX F

## CRITERION TESTS ADMINISTERED AS PART OF TOTAL DATA COLLECTION FOR THE UNIVERSITY OF MINNESOTA COORDINATING CENTER

TESTS ADMINISTERED AS PART OF TOTAL DATA COLLECTION FOR

THE UNIVERSITY OF MINNESOTA COORDINATING CENTER

Harcourt, Brace & World, Inc., 1964

1. Stanford Achievement Test, Primary II (Forms W, X)--Spelling.
2. Stanford Achievement Test, Primary II (Forms W, X)--Vocabulary.
3. Stanford Achievement Test, Primary II (Forms W, X)--Arithmetic.
4. Stanford Achievement Test, Primary II (Forms W, X)--Spelling.

Harcourt, Brace & World, Inc., 1951

5. Gilmore Oral Reading Test--Accuracy Test.
6. Gilmore Oral Reading Test--Rate Test.
7. An Inventory of Reading Attitude, San Diego County -- Attitude Inventory.
8. Writing Sample--Unique Stimulus Measure--Topic: "The Person I Would Most Like to be Like," Time limit: 20 minutes.

   a. Total number of words spelled correctly.

   b. Total number of running words.

   c. Average sentence length.

   d. Average communication length--based on analysis criteria discussed in The Language of Elementary School Children, by Walter D. Loban, National Council of Teachers of English, Champaign, Illinois, 1963. (Number of running words plus number of communication units.)

   e. Mechanical Ratio Scale:

$$\frac{\text{all numerators below added together}}{\text{all denominators below added together}}$$

   (1) Capital ratio:

$$\frac{\text{number of words child capitalized correctly}}{\text{number of words that should have been capitalized}}$$

   (2) Punctuation ratio:

$$\frac{\text{number of punctuation marks used by child}}{\text{number of punctuation marks that should have been used}}$$

   (3) Indentation ratio:

$$\frac{\text{number of indentations used by child}}{\text{number of indentations that should have been used}}$$

# APPENDIX G

## INFORMATION ON TEACHERS

### Year Two

### Year Three

Information on Teachers

Year 2

| Variable | Group B | Group B+ | Group P | Group P+ |
|---|---|---|---|---|
| Years Teaching Experience | 18.2 | 18.5 | 19.8 | 12.2 |
| Years Teaching 2nd Grade | 5.0 | 3.8 | 8.5 | 3.2 |
| Teacher Age | 42.2 | 40.. | 51.3 | 36.2 |

Information on Teachers

Year 3

| Variable | Group B | Group B+ | Group P | Group P+ |
|---|---|---|---|---|
| Years Teaching Experience | 8.2 | 7.4 | 10.2 | 17.0 |
| Years Teaching 3rd Grade | 5.0 | 3.4 | 5.8 | 8.4 |
| Teacher Age | 35.2 | 34.0 | 37.4 | 41.8 |

# APPENDIX H

## SAMPLE LESSON PLANS CONSTITUTING THE SUPPLEMENT (+)

## FOR PROGRAM B+ AND PROGRAM P+

(Lesson plan numbers refer to numbers
in the sequence of the teacher's
supplementary manual)

## 10-B Oral Language Supplement

### Oral Language--Punctuating a Story Read by Teacher

A. Purpose: To provide children an opportunity to use period, question mark, and exclamation mark as directly related to oral intonation patterns.

B. Materials needed: Peter Punctuation Puppet, colorful punctuation squares (from Lesson 9-B); story (provided) with children's names written in blanks; numbered papers to record marks; pencils (optional).

C. Note to the Teacher: This lesson plan relies on your development of vivid and clear intonation patterns in reading the sentences to the children. It should serve as a type of culminating activity in providing you with an indication of the children's awareness of the combined use of punctuation and intonation patterns as related to the meaning conveyed. The blanks provided in the story are to be filled in with the names of the children in your group. It will be helpful if this is done before the lesson begins. Blanks may be added or subtracted to accommodate your class size.

D. Suggested Procedure:

"Peter Punctuation Puppet is visiting with us again today and he has something to say to you."

(Puppet speaking) "I have just finished writing a story. Now I am an author just like you boys and girls. I think my story is very good, but I wasn't always sure just what punctuation marks to use. I know you have done a good job working with punctuation marks, so I thought you might be able to help me punctuate my story, so that the people who read it will know just how the people in the story feel. (Distribute colored punctuation squares.)

"Oh, you have cards with punctuation marks on them

on your desks, so you are all ready to help me. After I read a sentence, you hold up the punctuation mark that you think we should use, and be ready to tell me why you chose a particular punctuation mark. (If the answers are to be recorded on paper, explain at this time.) Okay, here we go."

"One bright sunny day, a happy crowd of boys and girls went to visit a zoo [.] When they came to the first cage, _____ said, "Look at the monkey swing by his tail [!] _____ and _____ started to look at the monkey but then they saw a big ape in the next cage [.] The children ran to the ape cage, but just as they got there, the big animal spit water all over and almost hit _____, _____, and _____ [!] _____ said, "He isn't nice [!]""Let's go see another animal," suggested _____ [.] _____ asked, "What would you like to see [?]" _____ and _____ both shouted, "The elephants [!]" When they got to the Elephant House, a zoo keeper let _____ and _____ feed peanuts to the baby elephant [.] They said, "That was fun [!]" _____ and _____ liked the elephants, but they wanted to see the fierce lions [.] They asked, "Where are the lions [?]" The zoo keeper showed them the way to the lion's cage [.] The lion roared at them [!] Then all of the boys and girls went home to tell their mamas and daddies about their exciting trip to the zoo [.]

Conclusion: "My, but you did well in using your period, question mark, and exclamation mark. I will visit with you another day and we will play another game. Until then please keep your punctuation marks well oiled and used!"

2. Linguistic Word Blocks: Introduction of Verb Block and Story Building

A. Purpose: To introduce the verb block and work on simple sentence construction using word substitution, in the subject-predicate pattern (1 2 pattern).

B. Materials needed:

The following word blocks: McGraw-Hill #16, #18

Allyn-Bacon #17, #19

Storage box containing the word block used in yesterday's lesson.

McGraw-Hill #6

Allyn-Bacon #7

C. Note to the Teacher: The ease or difficulty which some children may have in locating words on the blocks may require some provision for individual differences through grouping. You may find some children very efficient in locating words and others experiencing some difficulty. Should this be the case, consider grouping provisions, with at least two groups.

The oral expansion of the block stories into meaningful sentences should be considered a very important aspect of this lesson.

D. Suggested Procedure: Distribute the following two verb blocks to the children:

McGraw-Hill #16, #18

Allyn-Bacon #17, #19

Briefly review the concept of "verb" noting that the type of verb we are working with now tells about things people do. (This is an incomplete definition of a verb, as we will see when we attempt to apply this definition to copulative verbs, but for our

purposes in attempting to develop the idea of a group of words having similar characteristics. it will suffice. We will approach the more complete applied definition suggested by the structural linguistics in a later lesson.)

Play "Find the Verb" in reviewing the words on blocks #17 and #19 in Allyn-Bacon and blocks #16 and #18 in McGraw-Hill. This game is played by pronouncing one of the verbs on a block and asking the children to find it as quickly as possible and then use the word in a sentence. (e.g., "sees" or "sniffs" is pronounced by the teacher; the children then locate this word and raise their hands as soon as they find it. The teacher then asks the first child that found it or one of the other children to use the word orally in a sentence. As: "Bill <u>sees</u> the boat." or "Nip <u>sniffs</u> the ant.")

Now have the children take the noun block out of their word storage boxes (AB #7, MH #6). Ask the children to make a little story using the noun block and one of the verb blocks. (Point out that their blocks will work the same as their word cards in building stories.) As soon as each child has formed a story ask him to read it to the class.

Ask the children how they can change the name of the people in their story. (By rotating the noun block to the left.) Have the children do this, and select one or two children to read their stories.

Next ask the children how they can change the thing the person in the story is doing. (By rotating the verb block to the left.) Have the children do this, and again select one or two children to read their stories.

Explain to the children that we are ready to play a new game with the blocks. It is called "Make a Sentence Story." Inform the children

that you will tell them a little story and they will build the story from their blocks as quickly as they can. The person or persons that finish first will get to read the story to the class. More words will then be added to the story orally, so that we know more about it. (e.g., AB - "Bill sees." MH - "Sam trips.") The child raises his hand, indicating he has built the story. Then ask the child to read the sentence and add his own words to make the story more meaningful. (AB - "Bill sees the boat." MH - "Sam trips on the rug.")

The possibilities for your oral dictation and children's block duplication are the following:

Allyn-Bacon

| Noun | Verb | Verb |
|---|---|---|
| Bill | sees | runs |
| Linda | wants | comes |
| Mother | gets | jumps |
| Daddy | makes | plays |
| Rags | rides | helps |

McGraw-Hill

| Noun | Verb | Verb |
|---|---|---|
| Sam | sniffs | trips |
| Ann | licks | catches |
| Nip | drinks | skips |
| Tab | spills | kicks |
| Miss Pat | fills | brings |

(You may give the child who completes a sentence one point, and if he expands it to tell more about the story, two points. The children can

keep track of their scores, and the child with the highest number of points wins the game.)

Summarize the lesson by briefly reviewing the concept of noun and verb -- the part they play in a sentence to tell us something -- noting their order in the sentence (noun first and verb second in "our little stories").

Instruct the children to put their blocks carefully into their storage boxes. (As they do this, again draw the children's attention to the color scheme on the blocks and the matching one in the bottom of the box.) Tomorrow we will work with some new blocks in our block story time.

## 51. Linguistic Blocks: Expansion of Elements Within the Sentence

A. Purpose: To continue with use and familiarization of the compound subject. (Recursive transformation)

B. Materials needed: The following blocks:

MGH: 1, 4½, 6, 6½, 8½, 11, 12, 19, 24, 32, 35

AB: 1, 5½, 7, 7½, 10, 10½, 11, 24, 33, 35

C. Note to the Teacher: Even though the word compound subject is frequently used, it is not the objective of this lesson to teach this particular bit of English vocabulary. The term is used to acquaint the child with the concept of putting two nouns together with a conjunction. The transformational grammarian would define this operation as a recursive transformation and deal with it in much more abstract terms. The point to be made is that in the English language we cannot say "Linda Ricky" or "Ann Sam" when talking about more than one thing or person. There has to be a connecting word, which in this case is and. This will be a good basis for future lessons dealing specifically with conjunctions.

The plan has been designed for use by both McGraw-Hill and Allyn-Bacon groups. The block sentences for both groups are included in the one plan.

D. Procedure:

| | |
|---|---|
| MGH: AB: "Today we are going to continue working on the compound subject. Who remembers what a compound subject is? | You may have to review the compound subject, especially if it has been a few days since the last lesson. |
| Good for you, _____ (name). Now who can tell me when we use a compound subject? | Follow the same procedure of elicitation if necessary. |
| Excellent, you are very bright today. I am going to put two sentences on the board. I want to see if you can make one sentence which will mean the same thing as both my sentences. First, though, take out blocks numbers | While the students are taking out their blocks, write these two sentences on the board.<br><br>MGH: Sam drank milk.<br>Ann drank milk. |

| | |
|---|---|
| MGH: 6, 6½, 8½, 19, 32, 35<br>AB: 7, 7½, 10½, 22, 33<br>Remember you are going to make one sentence say the same thing as my two, here on the board. | AB: Bill liked dinner.<br>Ricky liked dinner.<br>You may give an example if the children do not catch on to your method. e.g., You might say, "(name) and (name) will read today." Explain that you could have said that with two sentences but you preferred only one. Continue this type of discussion until they have the concept. Have them make the one sentence with their blocks. |
| Who has the sentence? Very good. | Circulate around the room and see that each child has the correct wording. Give praise in each case. |
| Let's do one more. First put away the blocks you are using and take out these numbers:<br>MGH: 1, 4½, 11, 12, 24, 32, 35<br>AB: 1, 5½, 10, 11, 24, 33<br>Now watch the board and see if you can make one sentence out of my two sentences with the blocks you have in front of you. | Again, as the children take out their blocks write these sentences on the board and follow the previous procedure for getting them to use their blocks to make one sentence out of the two.<br>MGH: The desk is dirty.<br>The tent is dirty.<br>AB: The boat is fat.<br>The house is fat. |

| | |
|---|---|
| Who has it? Excellent. | |
| Now there is one thing you must notice about this sentence. | |
| Can you say: | |
| MGH: The desk and tent <u>is</u> dirty. | |
| AB: The house and boat <u>is</u> fat. | |
| No, you must say: | |
| MGH: The desk and tent <u>are</u> dirty. | |
| AB: The house and boat <u>are</u> fat. | |
| Can anyone tell me why? | |
| The verb has to be changed to agree with the number of people in the subject. <u>Are</u> goes with <u>more than one person or thing</u>. <u>Is</u> goes with only one person or thing. We will do more work on this later. Just try to remember that <u>is</u> goes with <u>one</u> and <u>are</u> goes with <u>more than one</u>. | You must do some adlibbing here. Your discussion about agreement will have to be geared to the level of understanding of your particular group. There will be some lesson plans dealing with this specific subject. Do not belabor the point at this time. You might have the children give a few of their own examples to point out the concept. |
| Here is a work study sheet which will help you remember our lesson on compound subjects. You are to read the two sentences and then try to make one sentence say the same thing. | Be certain each child understands the instructions. |

| | |
|---|---|
| Conclusion: Today we made one sentence do the work of two. We did this by using something called a compound subject. Who can give me an example of a compound subject?<br>Very good. | Continue a question and answer period until you feel the children have some understanding of the lesson. |
| Next time we will have some fun with another part of the sentence which can also be made compound. | |

Name_____ Worksheet #51
McGraw-Hill

Can you make these two sentences into one sentence having the same meaning?

Sam slid down the hill.

Ann slid down the hill.

---

The cat jumped on the ant.

The chicken jumped on the ant.

---

Mother is pretty.

Ann is pretty.

---

The cat liked the boy.

The dog liked the boy.

---

Can you make two sentences out of one sentence and show the same meaning?

Sam and Ann ate the candy.

1. _____

2. _____

56. Linguistic Blocks: Prepositional Phrases and Meaning

A. Purpose: To acquaint children with the function of prepositions and prepositional phrases and the meanings derived from their usage.

B. Materials needed: The following blocks:

MGH: 30, 30½, 31, 31½

AB: 30, 30½, 31, 31½

C. Note to Teacher: By this time most of the children know how to identify a preposition, but they may not be aware of the many ways a preposition may be used in a sentence. Further, there are some shades of meaning which need exploring. These lesson plans will serve as guides, but you must use your own genius when trying to get this across to children. Follow the basic plan but be prepared to deviate and innovate when the necessity arises.

D. Procedure: All Teachers: Today we are going to explore a word group which we use in our speech and which tells us where something is found or located. For instance,

| | |
|---|---|
| Where are we today? That's right. We are in school. | Elicit: "We are in school." (Ask for complete sentences in answers.) |
| Where is the roof? Fine, over is another of those words which tell where something is located. | Elicit: "The roof is over our head." |
| Now take out blocks MH & AB 30, 30½, 31 and 31½. Let's read the words on these blocks together. What do you notice about all these words? You all know these words, but let's see if we can discover something about their meaning. | Let the children read the words on these blocks. Elicit the fact that they tell where something is--its location. Take a ball of clay, a small box, or even a wad of paper will do. Obtain or borrow a marble, button, coin, dice, etc., and follow these instructions: |

| | |
|---|---|
| Now watch what I do with the marble and clay. | Make a ball of the clay and slowly push the marble into the clay. |
| What am I doing to the marble? | Elicit: "The marble is pushed into the clay." |
| Right you are, the marble is pushed into the clay, but let me ask you this question. Is the marble in the clay or is the clay around the marble? | Discuss how the two words are used to describe the same thing, but they are two different words and mean two completely different things. How important it is to know what you are saying and what you mean! You might get the children to decide which they think is better, <u>in</u> or <u>around</u>. |
| Now that you have decided which is better, let me ask you this question. Is the clay on top of the marble, or is the marble underneath the clay? | Continue this questioning with this sort of question: Is the clay on the bottom of the marble, or is the marble on top of the clay? What you are attempting to do is to get across the idea that there are many ways to describe location. Usually one description is better than another, depending on which object we wish to refer to or consider most important--i.e., the marble or the clay. |

The words we are talking about are called prepositions, of course, and they are very useful little words. When we use them in sentences, they are usually part of a group of words called a prepositional phrase. It is not important that you know that name, but it is important that you know how these little words and word groups carry meaning in a sentence. Let's do some work using these groups of words.

How many of you remember little Miss Muffet? Where did she sit? Fine, she sat on a tuffet.

Write "She sat ___ a tuffet" on the board.

Who can find the preposition on your blocks which belongs in this sentence?

Check to see that the appropriate block is found.

Now see if you can find the right preposition for this sentence.

Write on the board, "Jack and Jill went ____ the hill." Follow the same procedure as previously. Point out the prepositional phrases in both sentences and discuss whether or not they describe the location of these nursery rhyme characters. You may think of other examples if time permits.

| | |
|---|---|
| Today's worksheet will have some nursery rhymes which tell where something is. It is up to you to write the correct (prepositional phrase) words in the blank spaces. Perhaps the pictures will help you with the answers. | Pass out work-study sheets and briefly explain what the children are to do. |
| Conclusion: Today we have learned what a preposition does in a sentence. We have also learned that many meanings can come from one little word. Remember you may be on top of something, but it is also under you. Why must we be so very careful to say exactly what we mean? | Again try to involve the students in your conclusions and evaluations. |

Name_____ Date_____ Worksheet #56

Teacher_____ School_____

See if you can complete each sentence below. Then circle the preposition in each sentence.

1. Ding dong bell, pussy _____

_____ _____

2. The cow jumped

_____ _____ _____

3. Jack be nimble, Jack be quick, Jack jump

_____ _____ _____

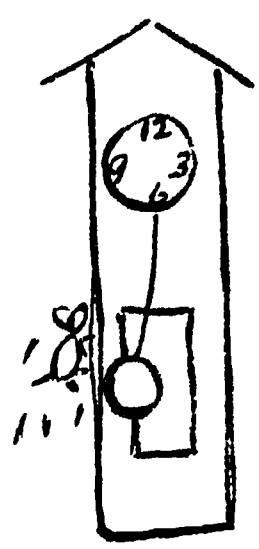
_____

4. Peter, Peter, Pumpkin Eater, had a wife and couldn't keep her. He put her _____ _____

_____ _____

5. Hickory Dickory Dock, the mouse ran _____

_____ _____



## 81. Linguistic Blocks: Clause Markers Carry Meaning

A. Purpose: To give the children review and practice in choosing clause markers that will signal meaning in agreement with the context.

B. Materials needed: Practice Paper.

C. Note to Teacher: The basic object of this lesson is to bring to the attention of the children the contrasts and changes in meaning when the words if, because, when, and why are interchanged. A secondary purpose is to reinforce the concept that these words introduce clauses which cannot stand alone but need some support from other segments of the sentence. In short, it is hoped to develop the concept that clause markers not only signal the beginning of a clause but help to indicate the meaning intended by the clause.

D. Procedure: All Teachers:

| | |
|---|---|
| | Have the children read the sentences which you write on the board and identify the clause markers. Erase only the marker in each sentence and substitute one of the other markers which makes sense but changes the meaning of the clause. |
| I am going to write four words on the board that you already know. Who can read them for us? | Write these words on the board:<br>If Because When Why<br>Discuss, and elicit if possible the fact that these words are clause markers. Review the meaning of a clause if necessary. Discuss the job of such words. They introduce or signal the beginning of a clause. Perhaps you should also note that these words can introduce a phrase as well, but for this lesson we will use only |

| | |
|---|---|
| | clauses. Draw parallels between phrases and clauses if there is confusion. |
| Now I am going to put some sentences on the board. Each sentence will have one of these markers in it. Read the sentence to yourself. | Write the following sentence on the board: The girl says she likes boys if they are good. (Be sure to leave each sentence for future work -- do not erase.) |
| _____ (name), will you read this sentence for us? Thank you, that was excellent. What does <u>if</u> do in this sentence? | Discuss the fact that <u>if</u> marks the beginning of the clause. It tells us that the girl likes only those boys who are good. Have one child frame the clause with his hands. Note that there are two functions of <u>if</u>. <u>If</u> defines the intensity of <u>like</u> and introduces the clause. Continue in like manner with the following sentences: The dog eats his dinner because it is good. (<u>because</u> introduces the reason for eating the dinner) "Why do you want to play ball?" asked the boy. (<u>why</u> is a substitute for the reason for wanting to play ball) |

| | |
|---|---|
| Now we shall see how clause markers can change the meaning of a sentence. Read the first sentence again. I'm going to erase *if* and write *when* in its place. Now what does the clause mean? | Discuss the meaning change, and point out the contrasts with the original meaning. In the second case girls like boys only for certain periods of time, *when* they are good. |
| | Continue substituting all four words in each of the sentences, discussing the meaning changes and the contrasts for each. Pass out the work sheet and read the instructions together. |
| Evaluation and conclusion: Why do you suppose we need clause markers? | Bring out the fact that generally these kinds of words are used to help make language, reading, talking, etc., much more understandable and enjoyable to see and hear. They add color to our sentences. We study them so we will know how to use them and be clearly understood in our own work. |

McGraw-Hill #81

Name_____ Teacher_____

IF BECAUSE WHEN WHY

Directions: Look at the four words at the top of the page. Read the story and choose one of these words for each of the blanks. Remember to think of the lesson for today as you work through this story.

Sam is a baseball fan. He likes nothing better than to watch a double-header on a warm, sunny, summer afternoon in Candlestick Park. If there is one thing he likes better than watching a double-header, Sam likes to play baseball. _____ he plays ball, he likes to play with only boys. Most of the boys have their own bats and baseballs, but Sam is the only one who owns a real big league set. He likes to use them _____ they are just like the ones used by Willie Mays.

One day Sam's little sister wanted to play ball with the boys. Sam said, "You can't play baseball _____ you're a girl." Ann stuck out her tongue and ran back to the house.

_____ Sam went to get his ball, he could not find it anywhere. He looked and looked, but it was lost. Finally, he went into the house and said, "Come on, Ann, you can play baseball with me."

"_____ do you want me to play now?" asked Ann.

Sam shuffled his feet and said, "Aw, it's _____ I can't find my baseball, and I want you to help me find it."

They both started looking and suddenly Ann called, "Here it is!"

"Where did you find it?" asked Sam with surprise.

"Under my chair," laughed Ann, "_____ that's where I hid it."

(Can you finish this story and draw a picture of what happened?)

97. Linguistic Blocks: Story Building

A. Purpose: To give children practice in employing all the previous learnings in story writing.

B. Materials needed: Worksheet

C. Note to the teacher: These last few lessons will deal specifically with the story writing aspect of our work. This is the end product of all we have done heretofore. The contrasts in meaning, the manipulation of words, the vocabulary building, etc., have been a prelude to the task of working with words both in writing and in speech. This lesson will give the child practice in tying paragraphs together. The first few sentences of three paragraphs will be given to the student who will then supply the remainder of the paragraph based on what is contained in the beginning sentences of the following paragraph. (The definition of inference and generalization varies from authority to authority. For the purpose of this plan it has been defined from an operational standpoint as you will note.)

D. Procedure: All teachers: For the next few lessons we are going to practice writing stories. We want you to use everything you have learned about writing and speaking since you started using the blocks. What are some of the things you have learned about writing and speaking? I am going to put the beginning of three paragraphs on the board. From these beginning sentences we will work together to see if we can make a complete story with three paragraphs. Then I want you to show me how well you can make a story if you know only the beginning sentences in each paragraph of that story. Here are the sentences.

Discuss and elicit that the use of color words makes more interesting language usage. Introductory sentences which are different and well thought out help also. Saying exactly what you wish to say is most important, etc.

Write the following sentences on the board in three different

places, leaving enough room under each set of sentences to complete a paragraph elicited from the children.

Paragraph 1. One dark, dreary night when only a little of the moon was showing, a large, bat-like figure came galloping by on a large white horse.

Paragraph 2. The door opened just a crack, and the horseman took a small bag which he quickly tucked into his wide black belt.

Paragraph 3. "Here is the bag, Robin," he gasped, and then he rode off into the woods.

Using these three sentences as the beginnings of three paragraphs, work with the children to build the story. Let them volunteer the thoughts and words and content, but attempt to elicit color words, descriptive phrases, good concluding and transitional sentences, etc. As they offer suggestions, you should write the sentences on the board and then ask if they go with the last sentence or with the next sentence. Ask if the sentences could be improved or the meaning made more

clear. You might have them underline certain words that describe, explain, show action, etc. If the lesson takes too long, it could be continued on another day. This is a reasonably important culminating exercise and should not be rushed.

Now, you have all had a chance to see how a story is built, and you have done a very good job of completing this one. Here is a worksheet that will give you a chance to show how well you can do the same thing by yourself.

Worksheet #97

Name _____ Teacher _____

Directions: Read the beginning sentences of the three paragraphs below. Decide how to make a story using the sentences. Complete the story in your own words using your imagination.

Sam, the little yellow and black kitten, seemed to have a special knack for getting into trouble. He was forever falling into something, getting tangled in something, or getting stuck in a tree.

Another time, Sam decided he would go to sleep in the open drawer of the little girl's dresser.

One of the funniest things that happened to Sam was when he tried to snitch a drink of milk from the top of a milk bottle which the milkman left on the front porch.

# APPENDIX I

# ANALYSIS OF COVARIANCE TABLES FOR DEPENDENT VARIABLES

TABLE 14

ANALYSIS OF COVARIANCE OF WORD MEANING SCORES FOR TREATMENT GROUPS B, P, B+ AND P+--YEAR 2

| Source of Variation | Degrees of Freedom | Sum of Squares | Mean Square | F Ratio |
|---|---|---|---|---|
| Basal Programs (B,P) | 1 | 214.00 | 214.00 | 5.18** |
| Supplementary Programs (B+, P+) | 1 | 43.68 | 43.68 | 1.06 |
| B.P. X S.P. | 1 | 346.79 | 346.79 | 8.40* |
| Error (within) | 319 | 13,173.69 | 41.30 | |

* Significant at the .01 level
** " " " .05 level

TABLE 15

ANALYSIS OF COVARIANCE OF WORD MEANING SCORES FOR TREATMENT GROUPS B,P,B+ AND P+--YEAR 3

| Source of Variation | Degrees of Freedom | Sum of Squares | Mean Square | F Ratio |
|---|---|---|---|---|
| Basal Programs (B,P) | 1 | 38.15 | 38.15 | 1.20 |
| Supplementary Programs (B+, P+) | 1 | 1.70 | 1.70 | .05 |
| B.P. X S.P. | 1 | 47.87 | 47.87 | 1.50 |
| Error (within) | 231 | 7347.47 | 31.81 | |

* Significant at the .01 level
** " " " .05 level

TABLE 16

ANALYSIS OF COVARIANCE OF WORD STUDY SKILLS SCORES
FOR TREATMENT GROUPS B,P,B+,P+ --YEAR 2

| Source of Variation | Degrees of Freedom | Sum of Squares | Mean Square | F Ratio |
|---|---|---|---|---|
| Basal Programs (B,P) | 1 | 226.74 | 226.74 | 1.84 |
| Supplementary Programs (B+,P+) | 1 | 198.78 | 198.78 | 1.61 |
| B.P. X S.P. | 1 | 2,098.65 | 2,098.65 | 17.03* |
| Error (within) | 319 | 39,305.65 | 123.22 | |

* Significant at the .01 level
** " " " .05 "

TABLE 17

ANALYSIS OF COVARIANCE OF WORD STUDY SKILLS SCORES
FOR TREATMENT GROUPS B,P,B + AND P+--YEAR 3

| Source of Variation | Degrees of Freedom | Sum of Squares | Mean Square | F Ratio |
|---|---|---|---|---|
| Basal Programs (B,P) | 1 | 126.97 | 126.97 | .93 |
| Supplementary Programs (B+,P+) | 1 | 18.12 | 18.12 | .01 |
| B.P. X S.P. | 1 | 733.01 | 733.01 | 5.39** |
| Error (within) | 231 | 31,436.32 | 136.09 | |

* Significant at the .01 level
** " " " .05 "

TABLE 18

ANALYSIS OF COVARIANCE OF REGULAR WORD IDENTIFICATION SCORES FOR TREATMENT GROUPS B,P,B+ AND P+ --YEAR 2

| Source of Variation | Degrees of Freedom | Sum of Squares | Mean Square | F Ratio |
|---|---|---|---|---|
| Basal Programs (B,P) | 1 | 205.26 | 205.26 | 1.28 |
| Supplementary Program (B+,P+) | 1 | 514.93 | 514.93 | 3.21 |
| B.P. X S.P. | 1 | 962.98 | 962.98 | 6.01** |
| Error (within) | 79 | 12,658.76 | 160.24 | |

* Significant at the .01 level
** " " " .05 "

TABLE 19

ANALYSIS OF COVARIANCE OF REGULAR WORD IDENTIFICATION SCORES FOR TREATMENT GROUPS B,P,B+ AND P+ --YEAR 3

| Source of Variation | Degrees of Freedom | Sum of Squares | Mean Square | F Ratio |
|---|---|---|---|---|
| Basal Programs (B,P) | 1 | 312.10 | 312.10 | 2.46 |
| Supplementary Programs (B+,P+) | 1 | 95.10 | 95.10 | .92 |
| B.P. X S.P. | 1 | 126.83 | 126.83 | 1.23 |
| Error (within) | 87 | 8,982.16 | 103.24 | |

* Significant at the .01 level
** " " " .05 "

TABLE 20

ANALYSIS OF COVARIANCE OF IRREGULAR WORD IDENTIFICATION SCORES FOR TREATMENT GROUPS B,P,B+ AND P+ --YEAR 2

| Source of Variation | Degrees of Freedom | Sum of Squares | Mean Square | F Ratio |
|---|---|---|---|---|
| Basal Programs (B,P) | 1 | 120.41 | 120.41 | 1.96 |
| Supplementary Programs (B+,P+) | 1 | 133.95 | 133.95 | 2.19 |
| BP. X S.P. | 1 | 152.06 | 152.06 | 2.48 |
| Error (within) | 79 | 4,842.31 | 61.30 | |

* Significant at the .01 level
** " " " .05 "

TABLE 21

ANALYSIS OF COVARIANCE OF IRREGULAR WORD IDENTIFICATION SCORES FOR TREATMENT GROUPS B,P,B+ AND P+ --YEAR 3

| Source of Variation | Degrees of Freedom | Sum of Squares | Mean Square | F Ratio |
|---|---|---|---|---|
| Basal Programs (B,P) | 1 | 6.74 | 6.74 | .16 |
| Supplementary Programs (B+,P+) | 1 | 17.55 | 17.55 | .43 |
| B.P. X S.P. | 1 | 71.61 | 71.61 | 1.75 |
| Error (within) | 87 | 3,568.03 | 41.01 | |

* Significant at the .01 level
** " " " .05 "

TABLE 22

ANALYSIS OF COVARIANCE OF PARAGRAPH MEANING SCORES FOR TREATMENT GROUPS B,P,B+,P+--YEAR 2

| Source of Variation | Degrees of Freedom | Sum of Squares | Mean Square | F Ratio |
|---|---|---|---|---|
| Basal Programs (B,P) | 1 | 1.88 | 1.88 | .02 |
| Supplementary Programs (B+,P+) | 1 | .36 | .36 | .00 |
| B.P. X S.P. | 1 | 1,792.44 | 1,792.44 | 15.04* |
| Error (within) | 319 | 38,022.94 | 119.19 | |

* Significant at the .01 level
** " " " .05 "

TABLE 23

ANALYSIS OF COVARIANCE OF PARAGRAPH MEANING SCORES FOR TREATMENT GROUPS B,P,B+,P+--YEAR 3

| Source of Variation | Degrees of Freedom | Sum of Squares | Mean Square | F Ratio |
|---|---|---|---|---|
| Basal Programs (B,P) | 1 | 48.41 | 48.41 | .49 |
| Supplementary Program (B+,P+) | 1 | 18.32 | 18.32 | .19 |
| B.P. X S.P. | 1 | 22.99 | 22.99 | .23 |
| Error (within) | 231 | 22,794.53 | 98.68 | |

* Significant at .01 level
** " " .05 "

TABLE 24

ANALYSIS OF COVARIANCE OF SENTENCE MEANING SCORES
FOR TREATMENT GROUPS B,P,B+ AND P+--YEAR 2

| Source of Variation | Degrees of Freedom | Sum of Squares | Mean Square | F Ratio |
|---|---|---|---|---|
| Basal Programs (B,P) | 1 | 141.56 | 141.56 | .78 |
| Supplementary Programs (B+,P+) | 1 | 44.22 | 44.22 | .24 |
| B.P. X S.P. | 1 | 455.91 | 455.91 | 2.49 |
| Error (within) | 319 | 58,290.69 | 182.73 | |

* Significant at the .01 level
** " " .05 "

TABLE 25

ANALYSIS OF COVARIANCE OF SENTENCE MEANING SCORES
FOR TREATMENT GROUPS B,P,B+ AND P+ --YEAR 3

| Source of Variation | Degrees of Freedom | Sum of Squares | Mean Square | F Ratio |
|---|---|---|---|---|
| Basal Programs (B,P) | 1 | 18.10 | 18.10 | .18 |
| Supplementary Programs (B+,P+) | 1 | 1.75 | 1.75 | .02 |
| B.P. X S.P. | 1 | 186.46 | 186.46 | 1.88 |
| Error (within) | 231 | 22,939.82 | 99.31 | |

* Significant at the .01 level
** " " " .05 "

ERIC REPORT RESUME

# APPENDIX D.--ERIC REPORT RESUME



OE 6000 (REV. 9-66)

DEPARTMENT OF HEALTH EDUCATION AND WELFARE
OFFICE OF EDUCATION

## ERIC REPORT RESUME

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TITLE

A LONGITUDINAL STUDY OF FOUR PROGRAMS OF READING INSTRUCTION VARYING IN EMPHASIS ON REGULARITY OF GRAPHEME-PHONEME CORRESPONDENCES AND LANGUAGE STRUCTURE ON READING ACHIEVEMENT IN GRADES TWO AND THREE (Final Report)

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INSTITUTION SOURCE

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RETRIEVAL TERMS

Longitudinal Study Grades 2 and 3; Reading Instruction; Variation in Control of Grapheme-Phoneme; Variation in Control of Language Structure as Related to Meaning; Relationship of Morphology and Syntax in Oral Language to Reading Comprehension

IDENTIFIERS P = McGraw Hill Programmed Reading; B = Allyn-Bacon Basal Reading Series; + = Special Language Structure Supplement

ABSTRACT The basic objective in the second and third years of this longitudinal study was to investigate the effect on children's decoding and comprehension skills of published and specially prepared reading programs varying in (a) the degree of regularity of grapheme-phoneme correspondences programmed into the vocabularly presented (Treatments: B vs. P; B+ vs. P+), and (b) the emphasis on language structure as related to meaning (Treatments: B vs. B+; P vs. P+). A secondary objective examined the relationship between children's control over their morphological and syntactical language systems and their reading comprehension achievement.

Teachers were randomly assigned to the four treatments and careful control was exerted over pupil and instructional variables in the twenty classrooms to insure experimental equivalence throughout the study.

The treatment group which controlled for correspondences and emphaaized language structure was found to produce superior decoding (P+>B+, years two and three) and comprehension skills (P+>P, year two) when compared with the contrasting treatment group. The treatment which did not control for consistency in correspondences nor emphasize language structure produced superior decoding (B>P, year two) and comprehension (B>B+, year two) skills when compared with the contrasting treatment. It was also concluded that reading comprehension achievement is a function of the control over morphological and syntactical elements in oral language.