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OF SECOND AND FIFTH GRADE CHILDREN.

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EFFECTS OF REDUNDANCY ON READING COMPREHENSION
OF SECOND AND FIFTH GRADE CHILDREN

by

Gerald Hatch Treadway, Jr.

A Dissertation Submitted to the Faculty of the
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THE UNIVERSITY OF ARIZONA

GRADUATE COLLEGE

I hereby recommend that this dissertation prepared under my direction by Gerald Hatch Treadway, Jr. entitled Effects of Redundancy on Reading Comprehension of Second and Fifth Grade Children be accepted as fulfilling the dissertation requirement of the degree of Doctor of Education

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After inspection of the final copy of the dissertation, the following members of the Final Examination Committee concur in its approval and recommend its acceptance:*

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ABSTRACT

The purpose of this study was to gain further insight into a linguistic factor that might affect children's ability to read. This research attempted to ascertain the effect of redundancy on children's comprehension at the second and fifth grades. Three hypotheses were tested: (1) second grade students' ability to comprehend reading material that matches their spoken per cent of redundancy is significantly greater than their ability to comprehend material which contains the per cent of redundancy found in a basal reading series, (2) no significant difference exists between fifth grade students' ability to comprehend reading material that matches their spoken per cent of redundancy and their ability to comprehend material which contains the per cent of redundancy found in a basal reading series, and (3) the students at both grades will indicate a preference for material which matches their per cent of spoken redundancy as opposed to the per cent of redundancy found in basal readers.

The subjects who participated in this study were 50 second and 50 fifth grade students who were enrolled in the public schools and who lived in middle-class neighborhoods in metropolitan Tucson, Arizona, during the 1969-1970 school year. Subjects in the second grade read between grade

levels 1.6 and 3.4. Subjects in the fifth grade read between grade levels 4.5 and 7.6.

A natural language sample was taken from second and fifth graders. These samples were analyzed to determine the per cent of redundancy and also served as passages from which comprehension questions were developed. Comparable passages from the Macmillan Basal Series were selected and comprehension questions were developed. Performance on comparable comprehension questions developed from the natural language passages and the basal passages were compared to ascertain the effect of redundancy on comprehension at the two grade levels.

The data were analyzed by the "t" test of proportions to compare the subjects' performance on the oral segment and basal segment of the second and fifth grade comprehension instruments. The χ^2 statistical procedure was utilized to test students' performance on the comprehension categories (1) reading to find the central idea, (2) reading to select supporting details, (3) reading to find sequences, (4) reading to find relationships, (5) reading to make inferences, and (6) reading to draw conclusions, within the comprehension instrument.

The first and second hypotheses were rejected. The third hypothesis which concerns students' preference toward oral language passages or basal passages, was accepted.

From the findings it is possible to state:

Students at both the second and fifth grades prefer written material which had as its basis oral language structures.

Students at the second grade are able to comprehend passages taken directly from oral language and basal passages equally well.

Students at the fifth grade are able to comprehend passages taken directly from oral language significantly better than basal passages.

Two assumptions were developed and utilized during the course of the research. They were: (1) that as the redundancy percentages of written material becomes closer to the subjects' oral language redundancy percentage the material is more easily understood, and (2) that as the percentage of redundancy increases the difficulty level of a passage decreases. When the two assumptions are applied to subjects' ability to comprehend written material, a stable effect is found.

The findings of this research suggest the following recommendations:

The study should be replicated with students from varying socio-economic backgrounds to determine if statistically significant variances exist between their oral language per cent of redundancy and their basal readers.

Research should be done to determine how children's use of conceptual repetition might be utilized in reading materials.

Additional research should be completed to investigate proper length of second grade basal stories since the topics which subjects spoke about at early grade levels generally did not exceed 250 words.

CHAPTER I

THE STUDY

For years a basic assumption underlying reading instruction has been that the vocabulary which children read, especially at the primary level, should be highly controlled. Essential to this assumption has been the notion that words of highest frequency should be taught at the outset and that many repetitions were necessary (Dechant, 1964). As a result the instructional materials have proven stilted and have deviated perceptibly from material written for non-instructional purposes and even more distinctly from spoken language (Jones, 1965). Recently, due mainly to the influence of linguists, many educators have postulated that reading might be more easily and effectively taught if the materials more nearly reflected natural spoken language.

One method of measuring the differences between present instructional materials and materials obtained from spoken language is to measure the redundancy levels of both. Until recently no research had been completed which directly tested children's ability to read material of varying percentages of redundancy.

Purpose of the Study

The purpose of this study was to gain further insight into a linguistic factor that might affect children's ability to read. This research attempted to ascertain the effect of redundancy on children's reading comprehension at the second and fifth grades.

Statement of the Problem

What effect does the redundancy in spoken language which has been replicated into reading material have on reading comprehension at second and fifth grade?

Hypotheses to be Tested

1. Second grade students' ability to comprehend reading material that matches their spoken per cent of redundancy is significantly greater than their ability to comprehend material which contains the per cent of redundancy found in a basal reading series.
2. No significant difference exists between fifth grade students' ability to comprehend reading material that matches their spoken per cent of redundancy and their ability to comprehend material which contains the per cent of redundancy found in a basal reading series.
3. The students at both grades will indicate a preference for material which matches their per cent

of spoken redundancy as opposed to material which matches the per cent of redundancy found in basal readers.

Significance of the Study

Much has been written about the role of reading materials as they affect children's ability to learn to read. Basal reading series, especially in the primary grades, place heavy emphasis on controlled vocabularies of high frequency words (Harris, 1968). As more is discovered about how children acquire language, many of the present materials in reading are coming under considerable scrutiny. There is no certainty that the basal reader materials which utilize high frequency words with many repetitions provide for maximal information or optimal word recognition and comprehension learning. Therefore, new procedures are being sought which will help determine reading material's worth. More specifically, one is not sure what effect redundancy has on reading comprehension. Does redundancy in written text provide needed clues or does it interfere with the reader's attempts to garner meaning? Does reading material which is uncontrolled and patterned after children's natural speech help or hinder the child's attempts to learn to read?

Since this study was an attempt to shed light on these questions, it is significant in the following ways:

1. The study adds to the present body of knowledge concerning the effects of redundancy on children's ability to comprehend reading material at grades two and five.
2. The study gives additional insight into the importance of sequencing instructional material in reading.
3. The information gained from this study can be of practical help in determining the construction and selection of children's reading material.

Definitions of Terms Used

In order to understand the context in which several terms are used the following definitions are presented.

Bits

The mathematical unit used for determining the amount of information contained in a sequence of letters (Carson, 1961).

Cloze Test

A readability test in which, "The investigator selects the passage he wishes to study, deletes every Nth word, and replaces the deleted words with underlined blank spaces of standard length [Bormuth, 1968]."

Comprehension

For the purposes of this study, comprehension will be defined as the effective use of the following skills: (1) reading to find the central idea, (2) reading to select supporting details, (3) reading to find sequences, (4) reading to find relationships, (5) reading to make inferences, and (6) reading to draw conclusions (Antley, 1967).

Constraint

The amount to which a letter(s) already in a sequence limits the amount of information which is added by the inclusion of a further letter in the same sequence (Carson, 1961).

Familiarity

A word is said to be familiar when a reader perceives that he has previously seen the word. As such, familiarity is a subconcept of frequency (number of times a word is repeated in a passage) (Klare, 1968).

Middle-class

The middle-class contains two divisions--upper-middle and lower-middle. Upper-middle class people generally have professional or executive positions and have earned a college degree. Lower-middle class people are generally white collar clerks, neighborhood businessmen, or

farmers, and live in a tract home in the suburbs. In addition, middle-class people are generally members of clubs, P.T.A.'s, and other civic organizations (Havighurst and Neugarten, 1962).

Natural Language

Natural language is the language obtained when students in 3-person peer groups talk informally about any subject which interests them (Carterette and Jones, 1965).

Redundancy

The extent to which letters in a sequence allow for predictability of any further letter placed in the same sequence. The letter sequence contained in often repeated words will cause those words to be highly redundant (Carson, 1961).

Delimitations of the Study

The delimitations of the study are as follows:

1. Only students in two grades, second and fifth, participated in the study.
2. The sample consisted of fifty (25 boys and 25 girls) second graders, and fifty (25 boys and 25 girls) fifth graders.
3. The students in the sample were from middle-class families who resided in metropolitan Tucson.

4. The reading ability of the second grade students ranged from grades 1.6 to 3.4, while the reading ability of the fifth grade students ranged from grades 4.5 to 7.6.
5. The natural language sample was taken from recordings of 3-person peer groups' conversations about topics which were of interest to the members.

Limitations of the Study

The following operated as limitations of the study:

1. The ability of the researcher to select from oral and written material passages of equal difficulty and to develop reliable and valid measures of reading comprehension from them.
2. The sample of language represented only one aspect of children's language.
3. The sample was taken from schools selected by school district personnel and an additional school had to be chosen because an insufficient number of subjects were initially secured from the first school.
4. With regard to the comprehension instrument, item N in the oral segment of the second grade comprehension instrument has only two possible answers giving a higher chance probability of correct response. In analyzing the comprehension categories, score values had to be equalized through a statistical operation since the number of items in each category varied.

Review of Related Literature

Redundancy and Information Theory

Shannon (1948) developed the mathematical theory of information of which redundancy is a part. Information theory is based on the concept that language, especially English, is not random. If our system were random each letter would leave the possibility of twenty-six other equally probable choices for the next letter (Jones, 1965; Newman and Gerstman, 1952). That it does not can be easily shown. Carson (1961) states that an individual, "can predict the next letter with far greater than chance accuracy [p. 46]." English text, then, rather than being totally random, is quite predictable. This can be demonstrated by the fact that Q is always followed by U, while the sequences QL, TSR, and SSS will never occur. Also #CHE (# = "space") is rather more common than #CHL (Hackett, 1953, p. 72). As the length of text increases the predictability of each increasing letter becomes better. Hackett notes how context influences the choices and probabilities of letter selection:

Having begun an utterance by pronouncing a /p/, a speaker of English is in a "post-/p/" state: he can choose any vowel, or /r,l,y,w/, as next "symbol," but not, for example, /t/ or /k/. The various possible choices have various relative probabilities. If he chooses /r/, he is then in a "post-/p/" state, with new limitations and new probabilities: any vowel, but not, for example, another /r/ or /p/ or /l/. And so on. It is to be noted that the post-/pr/ state is not identical with the post-/r/ state, established when a speaker begins his utterance with /r/ (p. 73).

Carson (1961, p. 46) stated that predictability of letters increases with sequence length, although even after indefinitely long sequences the predictability was not total. Jones (1965, p. 129) stated that optimum predictability occurred by the ninth letter of a sequence by which time it levels off. The prediction of a letter at the beginning or end of a sequence is unilateral prediction. The prediction of a deletion bordered on both sides by letters is bilateral prediction.

An inverse relationship exists between randomness and predictability. To the extent that letters in a sequence are predictable no new information is obtained. Conversely, the extent to which a sequence of letters is unpredictable, or random, new information is conveyed. The unpredictability of letters is measured in bits and termed residual uncertainty. Predictability causes constraint on the amount of information. For example, H often follows T. Therefore, T constrains, or limits, the amount of information given by H. Sequential constraint is the amount to which a letter(s) already in a sequence limits the amount of information which is added by the inclusion of a further letter in the same sequence.

Two types of constraint exist. Total distributional constraint is the difference between maximum uncertainty--a condition found if all letters were equally random--and average uncertainty found when single letters from actual

text are computed in a frequency distribution. Sequential constraint is the difference between "the average uncertainty of single letters in English and the residual uncertainty in the distribution of single letters constrained by a given sequence of letters [Carson, 1961, p. 46]." The measures of sequential constraint are three times the magnitude of total distributional constraint. It is also a measure of the structure of the language because it measures the influence of letters on one another. The measures of constraint given in this research are sequential constraint.

Carson (1961) defined redundancy as, "The difference between residual uncertainty in actual letter distribution and the maximum uncertainty which could exist if there were no predictability . . . [p. 48]." Redundancy is measured in percentages. One finds the amount of redundancy in a sequence of text by multiplying the amount of sequential constraint by one hundred (Jones and Carterette, 1963). Burton and Kicklizer (1955), Garner and Carson (1960), Miller and Friedman (1957), and Shannon (1948) all estimated the maximum unilateral sequential constraint (redundancy) in English to be approximately fifty per cent. Carson (1961, p. 54) found eighty-one per cent of the total sequential constraint to be contained within words while nineteen per cent was due to additional context.

Effect of Redundancy on Learning of Verbal Material

Information theory is useful because redundancy has been shown to exert a powerful effect upon the learning ability of verbal material by children and adults (Horowitz, 1961; McGinnies, Comer, and Lacey, 1952; Miller, 1958; Pierce, 1963; Rosenzweig and Postman, 1957; Spielberger and Denny, 1963). Miller (1958) studied the ability of students to recall redundant and random strings of letters. He found that redundant strings, as developed algebraically, were more easily learned than random strings. When the quantity of bits was computed for both strings, however, more information was found to be carried by the fewer learned random strings than with the greater number of learned redundant strings. It appears possible, then, to internalize a greater amount of familiar material without gaining as large an amount of new information as can be gained by internalizing a lesser amount of totally unfamiliar material. Pierce (1963) also found high frequency words to be identified faster than low frequency words, but when students were given a list of words to view ahead of time, no difference in recognition rates was found.

Literature on Redundancy and Reading Material

Carterette and Jones (1963) applied information theory to reading texts. They found a very regular function of redundancy in children's texts. First grade basal

readers were 51.8% redundant; third grade readers 41.4% redundant; and fifth grade readers 37.8% redundant. In another study Jones and Carterette (1963) studied children's free-reading choices to ascertain if any differences existed in the redundancy level between basal texts and free reading choices. Children's reading choices were taken from Wilson's Children's Catalog (West and Shor, 1961). Books for grades k to 2 or 3 were designated level 1, grades 2 or 3 to 5 were designated level 3, and those books from grades 4 to 6 were designated level 5. The amount of information in bits for the three levels was found to be relatively equal. Greater differences were found in the amount of redundancy: $L_1 = 42.5\%$, $L_3 = 37.6\%$, and $L_5 = 37.9\%$. A comparison of children's trade books with basal readers disclosed that level 1 was less redundant than first or second readers, while levels 3 and 5 approximated the fifth reader.

Carterette and Jones (1965, p. 78) found that natural speech transcriptions for first grade students yielded 38.9% redundancy, while the percentage of redundancy for the fifth grade was 37.5%. The first grade oral redundancy closely associated with the first grade students' free-reading choices redundancy and was considerably less than first readers. Because of the close association between free-reading choices and spoken redundancy levels, Jones (1965) stated: "Use of natural child speech should lead to more rapid learning than does the use of un-natural

stilted sentences, such as used in early readers, for these don't make sense to the child [p. 130]."

Language Acquisition and Natural Speech Patterns

Brown and Bellugi (1964), in a study of children's language acquisition, found that children's first speech patterns were reductions of larger adult speech patterns which they heard. The children reproduced "contentives" (nouns, verbs, and often adjectives) which were given the highest stress. To children, the use of contentives represents the whole of the larger structure which they are unable to reproduce. The contentives are words that make reference to the form classes. Children learned them one at a time and used them efficiently. This seems logical from a language structure point of view for the "functors" (generally the inflections, auxiliary verbs, determiners, prepositions, and conjunctions) carry very little lexical content. Yet, it is the functors, which carry little inherent meaning (and which the child naturally chooses to ignore while learning to speak), which are given the preponderance of attention in a number of beginning basal readers.

Natural speech patterns as an important aspect of what should be included in basal readers attracted other educators. Lloyd (1962) held that reading instruction should begin with familiar syntactic patterns. Through the

use of the familiar syntactic patterns technique the child learns that what he says can be written down. Ruddell (1965a) found that both the syntactic placement of words and their attendant intonational patterns were important. Spoken sentence patterns of high frequency were processed much more readily than low frequency patterns. Ruddell (1965b) also stated that the following conclusions concerning the effects of oral language on written material were warranted:

1. Reading comprehension is a function of the similarity of patterns of language structure in the reading material to oral patterns of language structure used by children.
2. Reading comprehension scores on materials that utilize high frequency patterns of oral language structure are significantly greater than reading comprehension scores on materials that utilize low frequency patterns of oral language structure (p. 275).

Everetts (1961) also found that a closer relationship between oral language and reading existed than had been previously recognized. Strickland (1962) stated that:

While children used a large number of patterns and combinations of patterns of structure, some basic patterns appeared with great frequency, and other patterns and combinations appeared with less frequency in the free talk of children. . . . Certain patterns which children used with great frequency appear to be basic building blocks of their language (p. 60).

Strickland also stated that the oral language of students is far more advanced than their readers; although she added

that she was not sure at that time whether it was a hindrance or an aid to reading comprehension.

Comprehension

Many models which purport to explain the mental processes involved in comprehension have been made. Cleland (1969) stated that the literature reveals that no one model is universally accepted. Smith (1969) held that comprehension as an important aspect of reading is in its embryonic stage. She held the term "comprehension" to be a blanket term which covered many aspects of the thought-getting processes in reading.

Redundancy and Comprehension. No specific studies have been completed which apply measures of redundancy to the comprehension skills. Anderson (1964) held that children, in order to comprehend, must have precise visual and auditory perception. Many linguists state that the reading process is a matter of decoding--an act of accurately discriminating and interpreting the graphemes into the appropriate phonemes. Bloomfield (1942) recommends that reading be taught as a process of translating phonemes (basic sounds) into words. A child works first with groups of letters, gradually learning words and later internalizes the larger comprehension units.

Reading comprehension appears to be a combination of letter-word perception and thinking about content. Both

were held to be integral parts of reading by Gray and Robinson (in Robinson, 1966) who perceived reading as word perception, comprehension, reaction, assimilation, and speed of reading. Smith (1963) stated that comprehension should be viewed according to four distinctive categories of thinking skills: (1) literal comprehension, (2) interpretation, (3) critical, and (4) creative reading. Guilford (1960) describes the act of thinking while reading as being similar to the thinking processes which take place during other cognitive endeavors. He delineated five general classes of thinking abilities which were held to be necessary for comprehension of reading material: (1) a class of cognitive abilities which have to do with discovery or recognition of information, (2) the retention of information, (3) and (4) are two areas of productive thinking by which we extend knowledge to generate new information; this class includes the concepts of convergent and divergent production, and (5) evaluation. One aspect of comprehension that has been widely discussed is "critical reading." Deboer (1946) stated that critical reading is:

The search for relevant materials, the evaluation of the data, the identification and comparison of sources, and the synthesis of findings. It involves the capacity for suspended judgment and the interpretation of the writer's motive. But chiefly, it involves a sufficient background of knowledge to provide a sound basis of judgment (p. 254).

A number of educators have investigated the student's ability to think when reading. Piekarz (1956) studied the reading skills used by sixth grade students. She reported that students' levels of comprehension were closely associated to their reading competence. The poorer students used mainly literal comprehension, while more facile readers divided their answers more evenly among literal meaning, implied meaning, and evaluation. McCullough (1957) found that students were able to think about story material in these ways: main idea, details, sequences, and creative reading. This study lends justification to the use of these categories in tests of reading comprehension in this research.

Readability is that aspect of the study of reading comprehension which is concerned with what makes reading material easy or difficult to understand. Two segments of readability which have been studied in some depth are word length and sentence length. Jones and Carterette (1963) found that difficulty level and word length were not constant. They stated that, "If the lexicon size is limited, it is not necessary to restrict its text to short words . . . [p. 492]." Bormuth (1968) found a correlation of $-.76$ and $-.68$ between word length and difficulty. Gallant (1964) found cloze tests to show sentence length to be a significant factor in early grade (one and two) difficulty. It appears from the literature that word and

sentence length, although not as strong a variable in passage difficulty as they were once thought to be, are still of considerable influence in the comprehension of textual material.

Increasing attention is being given in the literature to the distinction between the concepts "frequency" and "familiarity" of words. Jones (1965) found that, "For children, low frequency words behave more like non-words . . . [p. 131]." Jones also stated that fewer errors in processing words were made with familiar words than with unfamiliar ones, a finding similar to that of Pierce (1963). Bormuth (1968) stated that a marked correlation (.66) exists between familiarity and difficulty. Hansen (1964) stated that frequency alone is not as significant a factor as had been previously held; but, that familiarization training is significant. Perhaps, then, although high frequency words are perceived more easily than words of low frequency, this difference can be overcome if the low frequency words are first made familiar. Jones (1965) found that once a word reached the critical level of familiarity a word was readily available. The critical level was best reached through repetitions in many of the sense modalities. Jones summarized:

It is therefore not necessary to limit the vocabulary of beginning reading materials to the few hundred most frequent words in the language; it is only necessary that they be familiar. Secondly, one would want to introduce new words

in such a way that they should quickly reach the critical level, i.e., intensive aural, oral, visual, and motor practice (p. 132).

The use of high frequency words as the criteria, then, on the theory that they are the most familiar and therefore most learnable, may be an unnecessary restriction on children's reading vocabularies.

Carson (1961) found that function words are more redundant than content words. This could account for the higher redundancy rate of early readers. Coleman (1966) found a high positive correlation between the frequency of content words in twelve passages and comprehension as measured by summed cloze procedure. For function words, however, he found a high negative correlation between frequency and cloze scores. The inclusion of too many functors, then, seems to be a detriment to reading comprehension.

CHAPTER II

METHOD

This study was an attempt to learn more about redundancy, especially as it affects second and fifth grade students' ability to comprehend reading material. Also of interest to the investigator was the relationship between natural spoken language and the language of graded basal readers.

Subjects

The subjects who participated in this study were 50 second and 50 fifth grade students who were enrolled in the public schools and who lived in middle-class neighborhoods in metropolitan Tucson, Arizona during the 1969-1970 school year. Subjects in the second grade read between grade levels 1.6 and 3.4. Subjects in the fifth grade read between grade levels 4.5 and 7.6.

Because of a desire to have data as free from extraneous variables as possible, only students from the middle-class were used in the study.

Procedures

The schools which provided the subjects for this study were selected by school district personnel according

to Havighurst and Neugarten's (1962) classification of middle-class society. All second and fifth grade pupils in each grade were given a standardized reading test by the researcher to determine their reading grade level. The second grade subjects were given the Gates-MacGinitie Reading Test, Primary B, Form 1. A total of 160 second grade students took the standardized test. Eighty-four students (53%) who had test scores between 1.6 and 3.4 were selected as possibilities for the study. From these 84 students, 80 were selected randomly according to a table of random numbers. The Gates-MacGinitie Reading Test, Survey D, Form 2 was administered to the fifth grade subjects. A total of 175 fifth grade subjects took the standardized test. Eighty-six students (48%) who read between grade levels 4.5 and 7.6 were selected as possibilities for the study. From these fifth grade subjects, 80 were selected randomly utilizing a table of random numbers. These 160 students, 80 from each grade, comprised the sample for this research. Initially it was thought that a sufficient number of students for the sample could be secured from one school. When the standardized tests were administered to all second and fifth grade students at the first school it was discovered that an insufficient number of students had test scores between the established reading grade levels. A second school was then selected by school district personnel. The combination of the two schools yielded enough eligible

subjects for the sample. The number of students per grade varied between the two schools so 75 per cent of the subjects were selected from the original school and 25 per cent of the subjects were selected from the second school.

From the 80 students in each grade, three groups of students were randomly selected: (1) a group of 12 students made up four 3-person peer groups for the purpose of providing natural language samples, (2) a group of 12 students functioned as members of the pilot study, and (3) 50 students served as the experimental group for each grade.

Redundancy Data

The Language Sample. Although redundancy percentages of second and fifth grade oral language were available from another study it was decided that new measures of redundancy were necessary for this study because specific portions of the oral language sample in this study were to be extracted and used as passages from which comprehension questions would be made. New measures of redundancy were also required because the language passages from which the comprehension questions would be made were assumed to have a redundancy percentage equal to the total language sample from which they were extracted.

A group of 12 students was selected to act as four 3-person peer groups from which the natural language samples were taken. This procedure is similar to that used by

Carterette and Jones (1965) to obtain natural language samples. Within each grade, the 3-person peer groups were made up in the following combinations: three boys, three girls, one boy and two girls, and two boys and one girl. Three students, one 3-person peer group for each grade, were selected from one school, while the remaining three 3-person peer groups were chosen from the other school. Those subjects who were selected as members of the 3-person peer groups to provide the language samples did not participate further in the study.

The language samples were obtained by taking the members of a 3-person peer group to a room and recording their informal conversation. In both schools a utility closet approximately 10 feet by 10 feet served as a recording room. The closets contained shelves on which were placed miscellaneous school supplies. In both schools the closets were used by the reading specialist and other persons who were connected with the educational program at the school but who were not regular members of the school staff. Before the researcher went for the subjects, three chairs were placed in the room in triangular fashion. A Dejur Grundig Stenorette, Embassy Model, was set up and the microphone placed so that the voices of all three subjects could be heard. The Stenorette was set at the "Play" position, but the hand dial on the microphone was placed at the "Stop" position. This made it possible to begin the

taping session by simply changing the hand dial to "Play" position. The researcher went to the classrooms to bring the subjects to the recording room. While returning to the recording room the researcher participated in conversation with the subjects about casual events, but did not discuss with them the reason for their being called away from their regular classroom. Upon reaching the recording room the students were asked to sit in the prearranged chairs. The researcher then read a statement to the subjects. The statement for the second grade subjects was as follows:

I am trying to learn more about things that interest boys and girls your age. So I want you to talk with each other about anything you want to. I will leave you alone. Just before I go I will turn on the tape recorder so that later I will be able to know the kinds of things which you think about and say.

The statement for the fifth grade subjects was identical except for the substitution of "students" for "boys and girls" in the first sentence. The researcher then left the room until the end of the recording period was signaled by the Stenorette buzzer. The approximate time of each taping session was 45 minutes providing about 5400 words. This procedure was replicated as exactly as possible for the other 3-person peer groups for each grade.

The tapes of the conversations from the 3-person peer groups were then transcribed into the lexical words of standard English. The transcription rules of Carterette and Jones (1965) were followed:

(a) If you can't understand a word or any part of a word of a sentence, skip the whole sentence . . . , (b) Put in "noise words": "we-e-e-ll." "Uhm-m" . . . , (c) Do not put in sheer stammers. (d) Do put in word or phrase repetitions. (e) Start transcription only after they are warmed up. (f) Leave out repetition of words when in answer to a question like "what?". (g) If sentences are spoken at once by several people and are not clear--leave out. Interrupted but continued sentences should be included if unequivocal. Leave out the interruption (p. 136).

Each tape was transcribed by a technician experienced in the use of the Stenorette. As with the Carterette and Jones (1965, p. 27) study the placement of sentence marks presented a difficult problem. In this study only an end of sentence mark was used. After each tape was transcribed the researcher reviewed the tapes in order to verify placement of the terminal, fade-fall, and fade-rise junctures.

From each of the four transcriptions a language passage in excess of 1500 words was taken. When these four excerpts were combined they gave a total of 8798 words for the second grade, and a total of 7890 words for the fifth grade. In both instances the number of words exceeded the 6,000 words which were required for stable statistical results for determining the amount of redundancy, as stated by Carterette and Jones (1965, p. 25). These language passages for each grade were then used to determine the per cent of redundancy in the oral language of students in the second and fifth grade. Sections of these language

passages were also used to provide part of the comprehension instrument.

The Basal Reader Sample. Passages from both the second and fifth grade Macmillan Basal Series (Harris, 1965; Harris and Clark, 1965) were selected to serve as a comparison with the oral language samples for the amount of redundancy. The Macmillan Basal Readers are one of the more recently published series and according to the authors:

Vocabulary controls are so tightly geared to the expanding skills program that vocabulary is built up at a higher rate of speed than is customary in basal reading series (Harris and Clark, 1965, p. 8).

In view of the number of changes in basal readers, such as the one cited by the Macmillan authors, and those utilized in earlier editions of other basal series (Carterette and Jones, 1965), new measures of redundancy appeared appropriate.

The passages were taken from the beginning, middle, and end of each volume. From the second grade text, Enchanted Gates (Harris and Clark, 1965), the sections from pages 12 through 35, 116 through 147, and 226 through 250 were taken. From the fifth grade text, Bold Journeys (Harris, 1965), selections were taken from pages 4 through 14, 238 through 252, and 498 through 509. All portions of the selected pages were used for transcription purposes except poetry or stories which contained numerous foreign

words (Carterette and Jones, 1965, p. 135). From the second grade basal text a combined passage of 7609 words was selected; while for the fifth grade passage the total number of words was 6750. Both of these figures exceeded the minimum number of words necessary for stable statistical results for amount of redundancy.

Determining Redundancy Levels. A computer program which determines the amount of unilateral sequential constraint was secured from Dr. Edward C. Carterette and Dr. Margaret H. Jones of the University of California at Los Angeles. Unilateral sequential constraint is of importance because the usual amount of redundancy is found by multiplying the amount of sequential constraint at a lag of 10 (C_{11}) x 100. The program was originally used as part of a project entitled, Contextual Constraints in the Language of the Child, Project No. 1877 of the Office of Education, U. S. Department of Health, Education, and Welfare. The computer program is listed under the Biomedical Directory, Division of Biostatistics, as BMDX50. The program used a 28-character alphabet: 26 letters of the English alphabet plus word mark (slash) and sentence mark (period). Carterette and Jones (1965) have described the program as follows:

Briefly, contingency tables were constructed showing the number of times each character was followed by every other character, both immediately and at lags of 2, 3, ..., 11, 29, 59, and 119. From these

contingency tables, H_V , the information associated with this 28-state stationary Markov chain, was computed from

$$H_V = - \sum_{ij} P(i) P_{ij} \text{Log}_2 P_{ij}, \quad (1)$$

where $P(i)$ is the absolute probability of being in state \underline{i} and P_{ij} is the stationary transition probability of going to state \underline{j} on the $(n+1)$ th trial after being in state \underline{i} on the \underline{n} th. The relative sequential constraint on the second of a pair of characters when it is the \underline{n} th member of a sequence \underline{n} characters long (in which the first character of the pair is the first member of the sequence) is defined as C_n and is given by

$$C_n = \frac{\sum_{k=0}^{n-1} H_k(1:2)}{H(1)} \quad (2)$$

The Contingent uncertainty $H_k(1:2)$ is defined by

$$H_k(1:2) = H(1) - H_V(k), \quad (3)$$

where the first term of the right side of the equation is the uncertainty without sequential dependency, i.e., the average amount of information in each letter,

$$H(1) = - \sum_{i=1}^{i=a} P(i) \text{Log}_2 P(i). \quad (4)$$

$P(i)$ is the probability of the \underline{i} th symbol's occurrence. $H_V(k)$ is the Markovian information at lag \underline{k} . It is formally identical with Equation (1). The index \underline{k} specifies the forward distance of the transition from symbol \underline{i} to symbol \underline{j} . Thus, C_2 gives the relative sequential constraint on the second of a pair of characters in which the second character is contiguous to the first. C_3 gives the relative sequential constraint on the second of a pair in which the second is separated from the first by one character; and so on. Equation (2) makes the subscript of C (that is \underline{N}) equal to the lag plus one. We used \underline{k} 's of 1, 2, . . . , 11, 29, 59, 119, which yielded the constraints between all pairs of characters in which the second was at the designated step to the right of the first. Finally mean word-length and mean sentence-length for each text were calculated (p. 14).

The texts of the second grade oral language and basal passages and the fifth grade oral language and basal passages were key-punched on IBM cards according to the following directions:

- (a) Disregard all punctuation except periods. (Ignore dashes put a slash instead.) Use periods for semi-colons (if properly used), question marks, and exclamation points.
- (b) Omit all numerals, i.e., 1, 5, 8, but leave those in that are written out, i.e., one, five, eight.
- (c) Omit all foreign phrases.
- (d) Write contractions as they are, omitting the apostrophe, i.e., DONT, IM etc.
- (e) Omit mere abbreviations, i.e., Mrs., Mr., St., Ave., etc.
- (f) Use columns 1-72 only. Punch a space as a slash; punch a period as a period, i.e., ONE/DAY/LONG/LONG/AGO./THE/DOG
- (g) Omit titles like The Old Sled (Carterette and Jones, 1965, p. 135).

The Reading Comprehension Instrument

Oral Language Segment. After the oral and basal textual material from each grade had been processed for redundancy, passages for the comprehension instruments were selected. The segment of the comprehension instrument to be developed from the oral language transcriptions was given first consideration. Since the language sample was to be placed into the instrument with no modification except to be structured into basal format, the researcher reviewed all of the transcriptions. Those language samples which appeared to offer most in terms of content were selected. Then each passage was perused to determine if it contained sufficient content for the various categories of

comprehension questions: main idea, supporting details, sequence, relationships, inference, and making judgments (Antley, 1967). Each of the selected language samples was then checked for readability, utilizing the Spache Readability Formula for the second grade and the Dale-Chall Readability Formula for the fifth grade samples. Preliminary questions for each passage were then written. Finally, the oral passage of the comprehension instrument was chosen based on the prementioned criteria, suitability for comprehension questions, and readability scores.

The second grade oral passage which finally became part of the comprehension instrument was 283 words long. When the Spache Readability Formula was applied, the grade level score for the second grade oral passage was 2.864. The fifth grade oral selection which was ultimately selected to become part of the comprehension instrument was 532 words in length. When the Dale-Chall Readability Formula was applied to the fifth grade oral passage the grade level score was 5.641.

A total of fourteen comprehension questions each was developed for the second and fifth grade passages. There were five supporting detail questions, three inference questions, one main idea question, and one drawing conclusion question in the second grade passage with the same number of items in each category of the fifth grade instrument.

Basal Passage Segment. The same procedures utilized in the development of the oral language segment of the comprehension instrument were followed in the construction of the basal passage segment of the comprehension instrument. The categories of comprehension questions and the number of items in each category for the basal passage were matched exactly to the oral passage. This matching led to passages of similar length at each of the grades. The second grade basal passage which was finally selected, was 264 words in length, while the fifth grade basal segment which was finally selected was 571 words in length. When the Spache Readability Formula was applied, the second grade basal passage had a grade level score of 2.484; while application of the Dale-Chall Readability Formula to the fifth grade basal passage rendered a grade level score of 5.412. It was held by the researcher and two reading specialists that the disparity between the readability scores at each grade would not be significant factors in the student's performance on the test instruments.

The selected oral language passage with accompanying questions and the comparable basal reader passage with accompanying questions for each grade then became the comprehension instrument for that grade.

The Pilot Study. The purpose of the pilot study was to validate the comprehension instrument. Specifically it

was to determine: (1) if the instructions which accompanied the comprehension instrument were understandable to the respondents, (2) if any of the questions presented problems to the students because of unclear syntax, and (3) if any of the questions failed to discriminate reading ability as indicated either through total correct responses to an item(s) or a complete lack of correct responses to an item(s). The instrument was administered to 12 students from each grade. Item analysis of their performance revealed that in neither of the test segments (oral or basal) at the second or fifth grade were any of the items correctly answered by all students. Two items were answered correctly by only three subjects. When the items were examined it was found that the items were answered correctly by subjects who scored above the mean on their test performance. It was held that the items, although difficult, did discriminate and added additional power to the test, and therefore continued to be included in the test instrument. One item was held to have been answered incorrectly by respondents because of the syntactical arrangement of one of the possible answers. The necessary correction was made to the item and it also continued to be used as part of the instrument.

The Spearman Rank Order Correlation Coefficient (Rho) (Popham, 1967) was then used to ascertain the relationship between the subjects' performance on the

Gates-MacGinitie tests and their performance on the comprehension instruments. Tables 16 and 17 in Appendix A present the (Rho) coefficient for the second grade of .743 and the (Rho) coefficient for the fifth grade of .497. The coefficients were held to be of sufficient strength to allow usage of the comprehension instrument in the study.

The final comprehension instrument for each grade appears in Appendix D. Following each instrument is a listing of the comprehension category to which each item was classified by the researcher.

The Experimental Study. The final instrument was administered to all of the 100 subjects from both schools on the same morning by the researcher. The testing situation was similar for all students except that half of the students were given the oral portion first while the remaining half of the students were given the basal portion first. Finally, as each student turned in his test to the researcher he was asked which story he liked best. The researcher then tabulated the stated interest preferences of the students toward either the basal or oral story.

Statistical Analysis of Comprehension Instrument Data

Each student's total score for the oral segment of the comprehension instrument was calculated as a percentage of his possible score. The procedure was also followed for

the basal segment of the comprehension instrument. The percentage data by grade level were then analyzed by the "t" test (Popham, 1967) to compare the subjects' performance on the oral segment and basal segment of the comprehension instrument.

The total scores for the comprehension categories for both the oral and basal segments of the comprehension instrument for each grade were then weighted according to the number of items in each category. Since the category, "Supporting Details" contained the greatest number of items--five, it was used as the basis of the ratio utilized to gain item equivalence. Table 18 and Table 19, which may be found in Appendix B, present the equivalence scores which were obtained for the comprehension categories. The χ^2 was then used to determine if any differences existed between the totals for the oral comprehension categories of each grade. The Collapsed χ^2 was then used to determine which cells (comprehension categories), if any, were responsible for any differences found between the oral comprehension categories for each grade. The same statistical procedures were then utilized to determine if any differences existed between the comprehension categories of the basal comprehension categories. The χ^2 procedure was then utilized to discern if any differences were operant between like comprehension categories in the oral and basal segments comprehension instrument for each grade.

In order to determine if any statistically significant differences existed between the students' preference toward either of the stories at each grade the χ^2 statistical procedure was utilized.

CHAPTER III

FINDINGS

It was the purpose of this study to ascertain what effect spoken language redundancy, which had been replicated into textual material, has on reading comprehension at second and fifth grade. Further, it was the purpose of this study to ascertain if the redundancy found in basal readers constrained or helped students' reading comprehension of those readers. The findings will be discussed in the order in which they were presented in Chapter II.

Findings Related to Redundancy

A computer program for determining the per cent of redundancy, mean word length, and mean sentence length in the second and fifth grades was utilized in this study.

The second grade scores related to redundancy are presented as follows: (1) the redundancy figures for the second grade oral and basal passages, (2) mean word length for the second grade oral and basal passages, (3) mean sentence length for the second grade oral and basal passages, and (4) the total distributional constraint in the second grade oral and basal passages. The scores for the fifth grade are then given in parallel order to those for the second grade.

Table 1 presents the relative sequential constraint for the second grade oral and basal passages. The per cent of redundancy at any lag can be found by multiplying the listed sequential constraint by 100. Thus in the second grade, the per cent of redundancy for a lag of one (C_2) in the oral passage is 20.7, while for the basal passage it is 22.1.¹ The per cent of redundancy increases rapidly at the lower "C's" but the proportion of increase between each "C" diminishes until asymptote is reached by the ninth letter. The amount of redundancy in a passage is found by multiplying $C_{11} \times 100$. Thus for the second grade oral passage the per cent of redundancy is 39.6; while, for the second grade basal passage, the per cent of redundancy is 42.9. The difference between the second grade oral passage and second grade basal passage is 3.3 per cent.

The number of words in the second grade oral passage was 8798. The number of letters in the oral passage was 41,475 giving a mean word length of 4.714 letters. The number of words in the second grade basal passage was 6750. The number of letters in the basal passage was 33,149 giving a mean word length of 4.910 letters. The difference in word length between the second grade oral passage and second grade basal passage was .196 letters per word.

1. A lag of one is identical to the listed constraint of (C_2) and represents a pair of contiguous letters.

Table 1. Relative Sequential Constraint in the Second Grade Oral Language Passage and the Second Grade Basal Passage

Lags	Basal Passage	Oral Language Passage
C ₂	.221	.207
C ₃	.333	.308
C ₄	.378	.348
C ₅	.402	.369
C ₆	.414	.379
C ₇	.421	.386
C ₈	.424	.390
C ₉	.427	.392
C ₁₀	.428	.394
C ₁₁ ^a	.429	.396
Mean Word Length	4.910	4.714
Mean Sentence Length	6.853	8.468
Sample Size (No. of Words)	6750	8798

^aC₁₁ x 100 approximates the usual measure of per cent redundancy.

The mean sentence length for the second grade oral passage was 8.468; while the mean sentence length for the second grade basal passage was 6.853. The difference in sentence length between the two passages was 1.613 words per sentence.

The average uncertainty for both second grade passages may be found in Appendix C. The uncertainty for each letter is listed in alphabetical order. It should be noticed that the average uncertainty is identical to the percentage of each letter's total number to the total number of letters in the entire sample. For example, as one would expect, the vowels A, E, I, O, and U each make up a greater percentage of the total number of letters than the letter Q which is only .0002652 of the total number of letters. Table 2 lists the rank order of the occurrence of letters in both the basal and oral passages for the second grade in a descending order from highest per cent of total number of letters to lowest. The line connecting the oral passage column and basal passage column gives the position of each letter for comparative purposes. It should be noticed that all of the position changes between the letters come at the medial positions. The letters of highest frequency of repetition are in the same rank order for both basal and oral passages. The same appears to be true with the letters of lowest frequency.

Table 2. Rank Order of Letter Frequency of Occurrence for
Second Grade Oral Language and Basal Passages

Number	Oral Language Passage	Basal Passage
1	e	e
2	t	t
3	o	o
4	a	a
5	h	n
6	i	h
7	n	i
8	s	s
9	r	d
10	d	r
11	u	l
12	l	w
13	y	y
14	w	u
15	m	k
16	g	g
17	k	m
18	c	c
19	b	p
20	f	b
21	p	f
22	v	v
23	j	j
24	x	x
25	z	z
26	q	q

Table 3 presents the relative sequential constraint for the fifth grade passages. The amount of redundancy for the oral passage was 39.2%, while the per cent of redundancy for the fifth grade basal is 34.1%. The difference in redundancy between the fifth grade oral and basal passages is 5.1%. The mean word length for the fifth grade passage is 4.829, while for the fifth grade basal passage it is 5.233. The difference in word length between the two passages is .404 letters per word. The mean sentence length for the fifth grade oral passage is 7.326, while for the fifth grade basal passage it is 13.860. The difference in length for the two passages is 6.634 words per sentence.

The average uncertainty for both fifth grade passages is in Appendix C. The uncertainties are listed in alphabetical order.

Table 4 gives the rank order for the letters in descending order from highest per cent of constraint to lowest. The line connecting the oral and basal columns gives the position of each letter for comparative purposes. It should be noticed that the position of the letter "f" in the basal column is considerably divergent from the "f" in the oral column. Otherwise the same relative ranking of frequency of repetition of the letters seems to hold true for the fifth grade as in the second grade.

The first hypothesis for the study was: Second grade students will comprehend the oral passages portion of

Table 3. Relative Sequential Constraint in the Fifth Grade Oral Language Passage and the Fifth Grade Basal Passage

Lags	Basal Passage	Oral Language Passage
C_2	.199	.200
C_3	.279	.296
C_4	.309	.335
C_5	.324	.356
C_6	.330	.366
C_7	.335	.383
C_8	.337	.387
C_9	.339	.389
C_{10}	.340	.391
C_{11}^a	.341	.392
Mean Word Length	5.233	4.829
Mean Sentence Length	13.860	7.326
Sample Size (No. of Words)	7609	7890

^a $C_{11} \times 100$ approximates the usual measure of per cent redundancy.

Table 4. Rank Order of Letter Frequency of Occurrence for Fifth Grade Oral Language and Basal Passages

Number	Oral Language Passage	Basal Passage
1	e	e
2	t	t
3	o	o
4	a	a
5	h	n
6	i	s
7	n	h
8	s	i
9	d	r
10	r	d
11	l	l
12	u	u
13	y	w
14	w	f
15	g	m
16	m	y
17	k	g
18	c	c
19	b	p
20	p	b
21	f	k
22	v	v
23	j	j
24	x	x
25	z	z
26	q	q

the comprehension instrument significantly better than the basal segment of the test instrument. The data related to the first hypothesis will be presented as follows: (1) the total number of correct responses for each segment, (2) the differences between the scores on the basal and oral segments of the experimental test, (3) the differences between the total scores on each of the comprehension categories for each segment, and (4) a comparison between the responses on the basal and oral segments for each of the comprehension categories.

The total possible number of correct responses on the oral segment of the second grade experimental test was 700. The possibility also existed of a maximum score of 700 on the basal segment of the comprehension instrument. This condition would have existed had all 50 students answered each of the 14 items on the oral portion of the comprehension instrument test correctly. The condition would also have occurred had all items on the basal comprehension instrument been answered correctly. The second grade students obtained a total of 409 correct responses (59%) on the basal segment of the comprehension instrument. They correctly answered 430 items (61%) on the oral segment of the comprehension instrument. Each student's total score for the oral segment was calculated as a percentage of his possible score. This procedure was also followed for the students' scores on the basal segment. The "t" test

(Popham, 1967) was then utilized to assess the differences between the responses to the basal and oral segments of the comprehension test. Table 5 reports a "t" score of .378 on the two segments of the comprehension instrument which was not statistically significant at the .05 level.

Table 5. A Comparison Between Students' Performance on the Oral Language Segment and the Basal Segment of the Second Grade Comprehension Instrument

Test Sub-section	Number	Standard Deviation	Mean Exp. Test Score	"t"
Basal	50	25.82	59.98	.378
Oral	50	21.52	61.54	

The χ^2 statistical procedure was then applied to the totals for each comprehension category of the oral language segment of the comprehension instrument. Table 6 reveals a χ^2 score of 36.256 which is significant beyond the .001 level.

When analyzed by a Collapsed χ^2 to ascertain which cell(s), if any, were responsible for the significance found in the oral category, the "Inference" Comprehension cell was found to be significant beyond the .05 level. Table 7 reports a χ^2 score of 14.11 which was significant at the .05 level. The "Drawing Conclusions" cell was not statistically

Table 6. Comparison of the Number of Correct Responses in Each Comprehension Category in the Second Grade Oral Language Passage of the Comprehension Instrument^a

Comprehension Categories	Frequencies	
	Observed	Expected
Supporting Detail	179	150.6
Sequence	148	150.6
Relationship	138	150.6
Inference	104	150.6
Main Idea	135	150.6
Drawing Conclusions	200	150.6

^a $p < .001$ (5 df) = 20.517; $\chi^2 = 36.256$.

Table 7. Comparison of the Number of Correct Responses in the Second Grade Oral Language Passage of the Comprehension Instrument of the "Inference" Comprehension Category to the Remainder of the Comprehension Categories^a

Comprehension Categories	Frequencies	
	Observed	Expected
Inference	104	150.6
Other Categories	800	753

^a $p < .05$ (5 df) = 11.070; $\chi^2 = 14.11$.

measured for significance because the item contained only two possible answers.

The χ^2 procedure was then applied to the totals for each comprehension category for the second grade basal instrument. The χ^2 score of 22.62 which is significant beyond the .001 level is given by Table 8. When analyzed according to the Collapsed χ^2 , the scores for none of the comprehension categories in the basal segment were found to be statistically significant.

Table 8. Comparison of the Number of Correct Responses in Each Comprehension Category in Second Grade Basal Passage of the Comprehension Instrument^a

Comprehension Categories	Frequencies	
	Observed	Expected
Supporting Detail	162	142.33
Sequence	168	142.33
Relationship	133	142.33
Inference	116	142.33
Main Idea	110	142.33
Drawing Conclusions	165	142.33

^a $p < .001$ (5 df) = 20.517; $\chi^2 = 22.62$.

The χ^2 statistical procedure was used also to determine if any statistically significant differences were operant when like comprehension categories for the basal and oral segments of the comprehension instrument were analyzed. When one degree of freedom was used 3.841 was needed for significance at the .05 level. None of the six categories reached significance. The χ^2 scores in order from high to low were: "Drawing Conclusions," 3.16; "Main Idea," 2.35; "Sequence," 1.14; "Inference," .55; "Supporting Detail," .53; and "Relationships," .058.

Based on the "t" score of .378 and the χ^2 scores when like comprehension categories were tested, the hypothesis that second grade students will comprehend the oral passage portion of the comprehension instrument significantly better than the basal segment of the test instrument must be rejected.

The second hypothesis which was tested was that no significant difference existed between fifth grade students' ability to comprehend reading material that matches their spoken per cent of redundancy and their ability to comprehend material which contains the per cent of redundancy found in a basal reading series.

The fifth grade scores are presented as follows:

(1) the total number of correct responses for each segment,

(2) the differences between the total scores on the basal and oral segments of the comprehension instrument, (3) the differences between the total scores for each of the comprehension categories on each segment, and (4) a comparison between the responses on the oral and basal segments for each of the comprehension categories.

The total possible number of correct responses from all students for the oral segment was 700; while the same existed for the basal segment. The fifth grade students obtained a total of 423 correct responses (60%) on the basal segment. They also answered correctly a total of 464 items (66%) on the oral segment of the comprehension instrument. Each student's total number of correct answers for each segment was then assigned a percentage score. The "t" test (Popham, 1967) was then utilized to assess the differences between the responses to the basal segment and to the oral segment of the comprehension instrument. Table 9 reports a statistically significant score of 6.18 on the two segments of the comprehension instrument.

The χ^2 procedure was applied to the total number of correct responses for each comprehension category of the oral segment of the comprehension instrument. Table 10 reports a χ^2 score of 19.04 which was significant at the .01 level.

When analyzed by the Collapsed χ^2 procedure, the "Sequence" comprehension category of the oral language

Table 9. A Comparison Between Students' Performance on the Oral Language Segment and the Basal Segment of the Fifth Grade Comprehension Instrument^a

Test Section	Number	Standard Deviation	Mean Exp. Score	"t"
Basal	50	5.65	59.97	6.18
Oral	50	5.08	65.02	

^aSignificant beyond the 0.01 level.

Table 10. Comparison of Number of Correct Responses in the Comprehension Categories for the Fifth Grade Oral Language Segment of the Comprehension Instrument^a

Comprehension Category	Frequencies	
	Observed	Expected
Supporting Detail	174	163.67
Sequence	218	163.67
Relationship	145	163.67
Inference	140	163.67
Main Idea	150	163.67
Drawing Conclusions	155	163.67

^a $p < .01$ (5 df) = 15.086; $\chi^2 = 19.04$.

passage was found to be statistically significant at the .05 level. A χ^2 value of 11.594 which is significant beyond the .05 level is presented in Table 11. The remaining scores in order from high to low were: "Drawing Conclusions," 3.36; "Inference," 1.64; "Supporting Details," 1.48; "Main Idea," .262; and "Relationship," .126.

Table 11. Comparison of the Number of Correct Responses in the "Sequence" Comprehension Category to the Remainder of the Comprehension Categories of the Oral Language Segment of the Comprehension Instrument^a

Comprehension Categories	Frequencies	
	Observed	Expected
Sequence	218	163.67
Other Categories	764	818.85

^a $p < .05$ (5 df) = 11.070; Collapsed χ^2 (Sequence) = 11.594.

The χ^2 procedure was then applied to the total number of correct responses for each comprehension category in the basal segment. Table 12 offers a χ^2 score of 16.24 which was significant at the .01 level.

Table 12. Comparison of Number of Correct Responses to Each Comprehension Category in Fifth Grade Basal Segment of the Comprehension Instrument^a

Comprehension Category	Frequencies	
	Observed	Expected
Supporting Detail	151	157
Sequence	175	157
Relationship	138	157
Inference	128	157
Main Idea	160	157
Drawing Conclusions	190	157

$$^a p < .01 (5 \text{ df}) = 15.070; \chi^2 = 16.24.$$

When analyzed by the Collapsed χ^2 procedure no comprehension category of the basal segment of the comprehension instrument was found to be significant.

The χ^2 statistical procedure was also used to determine if any statistically significant differences were operant when like comprehension categories for the basal and oral segments were analyzed. When one degree of freedom was used, 3.841 was needed for significance at the .05 level. A score of 4.48 for the comprehension category "Sequence," which was significant at the .05 level, is reported in Table 13.

Table 13. A Comparison of Fifth Grade Students' Performance Between the Oral Language Passage and the Basal Passage on the "Sequence" Comprehension Category of the Comprehension Instrument^a

Comprehension Category	Frequencies	
	Observed	Expected
Sequence (Oral Language Passage)	218	196.5
Sequence (Basal Passage)	175	196.5

$$^a p < .05 (1 \text{ df}) = 3.841; \chi^2 = 4.48.$$

Based on the "t" score of 6.18, which was significant at the .01 level, and the significant difference in the scores on the "Sequence" comprehension category between the oral language passage and the basal passage, the second hypothesis which stated that no significant difference existed between fifth grade students' ability to comprehend reading material that matches their spoken per cent of redundancy and their ability to comprehend material which contains the per cent of redundancy found in a basal reading series, must be rejected.

Students' Preferences Toward the Basal and Oral Stories

The third hypothesis which was tested was that the students in both grades would indicate a preference for material which matches their per cent of spoken redundancy

as opposed to a preference for material which contains the per cent of redundancy found in basal readers.

The preference of the students toward the basal passage or oral passage was measured by the χ^2 procedure. With one degree of freedom, a χ^2 score of 3.841 was required for the .05 level of significance, and 10.827 was required for the .001 level of significance. Table 14 reveals a significant difference ($p < .001$) between the second grade students' preference of the oral passage over the basal passage reflected in the χ^2 value of 19.81.

Table 14. A Comparison Between Second Grade Students' Preference Toward the Oral and Basal Stories^a

Story	Sex	
	Boys	Girls
Oral	22	17
Basal	3	8

^a $p < .001$ (1 df) = 10.828; $\chi^2 = 19.81$.

Table 15 reveals a significant difference ($p < .05$) between the fifth grade students' preference of the oral passage over the basal passage.

Table 15. A Comparison Between Fifth Grade Students' Preference Toward the Oral and Basal Stories^a

Story	Sex	
	Boys	Girls
Oral	17	12
Basal	8	13

$$^a p < .05 (1 \text{ df}) = 3.841; \chi^2 = 4.02.$$

These scores indicate that the third hypothesis which was that the students at both grades will indicate a preference for material which matches their per cent of spoken redundancy as opposed to a preference for material which contains the per cent of redundancy found in basal readers should be accepted.

CHAPTER IV

DISCUSSION

The difficulty of determining which factors have the greatest influence on comprehension of written material has been stated by Spache and Spache (1969). Certainly some written passages are easier to understand than others. Bormuth's (1968) work concerning readability has shown that a greater number of significant factors than word frequency, word length, and sentence length are involved in reading comprehension. The percentage of redundancy in written material has also been shown to effect the difficulty of written material (Carterette and Jones, 1965).

In order to discern the factors which are of primary importance to the present study in the clearest possible way, the discussion will be presented according to the following sequence: (1) the factors which appear to account for rejection of the first and second hypotheses of the study will be developed. The possible explanations for the direction of the students' preferences regarding the comprehension passages as stated in the third hypothesis will be reviewed. Finally, an observation which the researcher made during analysis of the oral language samples will be discussed.

The first hypothesis which was tested was that second grade students' ability to comprehend reading material that matches their spoken per cent of redundancy is significantly greater than their ability to comprehend material which contains the per cent of redundancy found in a basal reading series.

A basic assumption underlying the first hypothesis was that a great disparity would exist between the redundancy percentages for the oral and basal passages which was in agreement with the Carterette and Jones (1965) study. It was thought that the students would comprehend the oral segment of the second grade comprehension instrument significantly better than the basal segment of the comprehension instrument. Although the researcher was aware that some changes in basal readers had occurred since the Carterette and Jones (1965) study was made with the Ginn Basal Readers, it was not expected that the changes in redundancy percentages which were subsequently found in the present study would be so dramatic.

The second hypothesis which was tested was that no significant difference exists between fifth grade students' ability to comprehend reading material that matches their spoken per cent of redundancy and their ability to comprehend material which contains the per cent of redundancy found in a basal reading series. This second hypothesis

was also made with the findings of the Carterette and Jones (1965) research in mind.

Since this study illuminated redundancy changes in basal materials, it is important to compare the redundancy percentages for the second and fifth grades for the present study with those found in the study completed by Carterette and Jones (1965). The Carterette and Jones study reported redundancy percentages for the second grade Ginn Reader (Russell, Wulfing, and Ousley, 1957) of 48.7%. The redundancy score on the second grade basal reader passage for the present study is 42.9%. The Carterette and Jones study reports redundancy percentages for the fifth grade Ginn Reader (Russell, McCullough, and Gates, 1957) of 37.7%, while the present study yielded a redundancy percentage for the fifth grade basal reader of 34.1%.

The redundancy percentages for oral language samples at second and fifth grades in this research were similar. Carterette and Jones (1965) report a redundancy percentage for the first grade oral language sample of 38.9%; and for the third grade oral language sample of 38.7%. When a second grade oral language sample score is interpolated from the two scores a percentage of 38.8% is derived. The redundancy percentage for the second grade oral language sample in this study is 39.6%. Carterette and Jones reported a redundancy percentage of 37.5% on the fifth grade

oral language sample, while the fifth grade oral language sample redundancy percentage was 39.2% for this research.

In comparing the difference between basal material redundancy percentages with oral language sample redundancy percentages the changes in basal material redundancy were further high-lighted. In the Carterette and Jones (1965) study the difference between the second grade oral language redundancy percentage score and the basal reader redundancy percentage was 9.8%. The difference between the second grade basal reader redundancy percentage and oral language sample redundancy percentage for the present study is 3.3%. The difference between the redundancy percentages on the fifth grade oral language sample and the basal reader sample was .2% in the Carterette and Jones study, while a difference of 5.1% redundancy was found in this research.

In summary, the difference between the second grade oral language sample redundancy percentage and basal reader percentage decreased by 6.5% from the Carterette and Jones (1965) study to the present study. The difference between the fifth grade oral language sample redundancy percentage and basal reader redundancy percentage increased by 4.9% from the Carterette and Jones study to the present study.

Before the redundancy percentages found in the oral and basal passages for both grades in the present study is related to the comprehension instrument, two points regarding percentages of redundancy as they affect the difficulty of a

passage and its relationship to the percentage of redundancy found in oral language are in order. Carterette and Jones (1965) stated that passage difficulty increases as the percentage of redundancy decreases. The researcher holds that an additional assumption is of importance when analyzing the effect of redundancy on the comprehension of written material. The second assumption is that students prefer written material which matches their oral language redundancy percentage (Jones, 1965) and, as such, as material comes closer to matching the student's oral language redundancy percentage it becomes easier to comprehend. When the two previously mentioned assumptions are coupled together an interesting pattern emerges. Figure 1 shows how this relationship functions. The top two lines show varying percentages of redundancy as represented by the space between the two lines. The vertical line which passes through the two lines represents the placement of the oral language percentage within the wider range of redundancy percentages. As the amount of basal language percentage of redundancy deviates farther from the oral language redundancy percentage the material becomes increasingly more difficult. On the other hand if the basal material deviates toward the higher redundancy percentages it becomes easier. Thus, as material moves away from the oral language redundancy percentage toward higher percentages of redundancy it is at the same time becoming harder and easier, or theoretically,

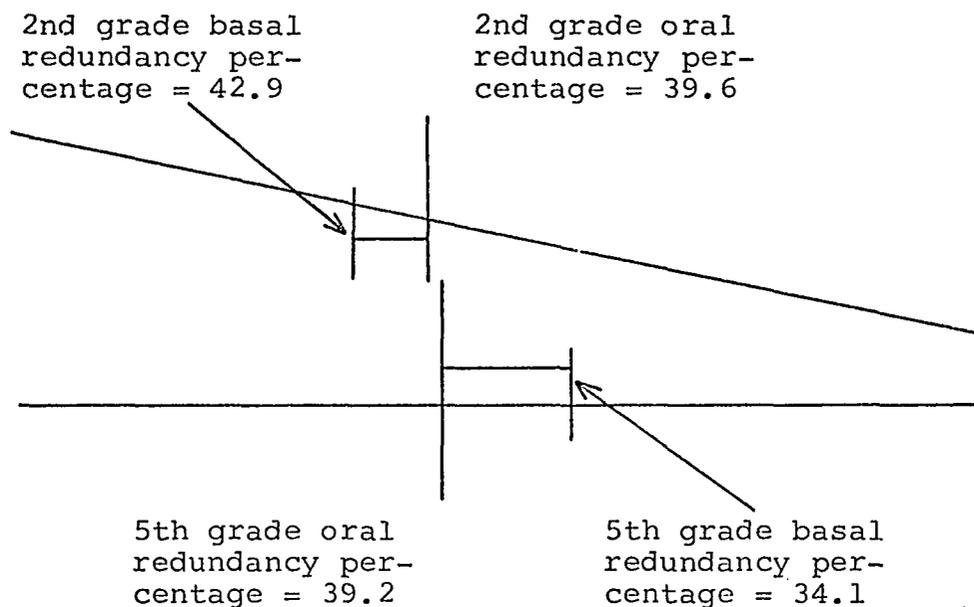


Figure 1. The Interrelationship Between Passages' Closeness to the Oral Language Percentage and the Difficulty of a Passage as Represented by the Percentage of Redundancy

remaining relatively at the same difficulty level. When the basal passage moves to redundancy percentages that are less than the oral language redundancy percentages the passage becomes more difficult on two counts. The passage becomes more difficult because it is moving away from the oral language redundancy percentage, while at the same time it increases in difficulty due to the lesser per cent of redundancy. If the assumptions do, in fact, operate, it would be expected that the second grade subjects would answer the two segments of the comprehension instrument equally well. A non-significant "t" score of .378 was obtained when the second grade oral and basal segments of the comprehension instrument were tested. The score of .378 revealed that any

difference between the scores for the segments could have occurred due to change alone (Edwards, 1967). The "t" of .378 appears to support the prior assumptions.

Even when like comprehension categories within the oral and basal segments were compared none of the six categories were significant at the .05 level. Also, when the passages were analyzed to determine if either the oral or basal percentage of redundancy was significant in allowing the subjects to answer any of the comprehension categories better than the other categories, only the "inference" category of the oral segment was significant at the .05 level. The scores obtained from the other tests on the second grade comprehension instrument also corroborate the fact that the passages were of essentially equal difficulty. A X^2 score of 36.256 was obtained from the totals for each of the comprehension categories of the second grade oral segment of the comprehension instrument. The "inference" comprehension category was found to be significant when five degrees of freedom were used. The score of 104 revealed that the students answered the items less than the expected number of times. No category was found to be significant when the collapsed X^2 was applied to the comprehension areas of the second grade basal test. This evenness of scores was reflected throughout the items. No pattern emerged from the scores on the items. It might be

assumed that the students were able to answer all comprehension categories equally well. While the experimental instrument in this study included a greater number of comprehension categories than are generally found in standardized comprehension instruments, the findings are in agreement with McCullough (1957) who showed that students were able to successfully answer the types of questions utilized in general comprehension instruments; a situation also found by Payne (1965) and Russell (1956).

The fifth grade scores also corroborate assumptions described in Figure 1. The "t" score between the fifth grade oral and basal segments revealed a score of 6.18 which was significant beyond the .01 level. When like comprehension categories were tested with the χ^2 procedure, the "sequence" comprehension category was found to be significant, meaning that the students did better on the oral portion of the test than the basal segment. No other categories were found to be significant. No pattern of significance appears to emerge when the oral and basal segments of the fifth grade comprehension instrument are statistically analyzed. When the comprehension categories for the fifth grade oral segment of the comprehension instrument were examined by the χ^2 procedure a score of 19.04 was found which is significant at the .05 level. The score of 19.04 implied that enough difference existed between the categories to assume that the students were able

to answer questions from some categories significantly better than others. When the collapsed χ^2 was applied only the "sequence" comprehension category was found to be significant. As for the basal comprehension categories a score of 16.24 was found which was significant at the .01 level. None of these categories were found to have sufficient strength to account for the significance. In other words, the amount of redundancy found in basal readers as opposed to the redundancy percentage found in oral language samples had little if any effect on students' ability to answer any particular comprehension category better than any of the other categories.

The totality of the scores derived from statistical analysis of the fifth grade comprehension instrument revealed two findings: (1) students were able to comprehend the oral segment of the comprehension instrument significantly better than the basal segment and (2) the significance was not arrayed in any discernible pattern and should be assumed to be globally distributed among all of the comprehension categories. The lone exception was the "sequence" category.

The first assumption, that as material becomes less redundant they become more difficult to comprehend, is supported by the comparison of the findings of this study with the findings of the Carterette and Jones (1965) research. The second assumption that as material comes closer to the oral language percentage of redundancy it is easier

to comprehend, can only be considered speculative. Assumption two would seem to be most tenable at the initial levels of reading instruction. Once a child reaches, for example, age ten, the change in his spoken per cent of redundancy will not decrease in an amount commensurate with his ability to comprehend passages of greater difficulty. Thus, after a child reaches his adult per cent of spoken redundancy all reading material when compared to the oral redundancy percentage will appear to be too difficult for him. The researcher proposes that the concept of materials becoming easier to comprehend as it approaches the reader's oral language percentage of redundancy as a criterion of written material's worth be limited to initial reading instruction. The second assumption's primary value can be in allowing educators to better write materials in which the transfer from spoken language to printed symbol is made. Once students' spoken level of redundancy has reached asymptote to the age at which a student can read material of varying difficulty the concept should be discontinued.

The third hypothesis which was tested was that students at both grade levels will indicate a preference for material which matches their per cent of spoken redundancy as opposed to the per cent of redundancy found in basal readers.

The data concerning the students' preference towards either the basal or oral passages indicate that

they comprehend best their preference although significance was reached only at the fifth grade. It is interesting to note that the students preferred the oral passages in both the second and fifth grade. This preference occurred even though the redundancy percentages for both passages varied greatly. At the second grade level the students both answered more of the oral passage questions and preferred the oral passage, even though it had a lower redundancy level. At the fifth grade level the students answered more of the oral language comprehension questions and preferred the oral passage to the basal passage even though the oral passage was higher in redundancy level. The fifth grade oral scores, when the two assumptions of passage difficulty as measured by a closeness to the oral language redundancy percentage and the percentage of redundancy are used, should be easier to comprehend and hence supposedly preferred.

In summary, the comprehension scores which were expected, given the redundancy scores for the present study, did, indeed, occur. The second grade redundancy percentages on the oral language sample and the basal reader sample were shown to be nearly of equal difficulty and the students were able to equally comprehend questions based on the redundancy percentages. Additionally, the fifth grade redundancy percentages were shown to be divergent, giving rise to a large expected difference between the student's ability to

comprehend the oral and basal segments of the comprehension instrument. The significant "t" score of 6.18 reveals that the expected did occur.

While analyzing the language samples, the researcher became aware of a factor which was deemed of sufficient significance to report in the discussion. The researcher observed that an aspect of reading content that appeared important to oral language was missing from basal text. The missing element was the use of repetition as a method of further clarifying concepts. Although the use of repetition was used at both second and fifth grade it was especially noticeable in the tapes of second grade oral language. The students' use of repetition was at the conceptual level rather than the word level as is most commonly utilized in basal readers. It became apparent while listening to the oral language tapes that the students made great use of repetition through paralanguage (pitch, stress, and juncture). While talking in the 3-person peer groups, the students appeared to seek signs of agreement or apparent lack of comprehension from the other students. If the speaker perceived, or was told by the other students that they were not receiving a clear conceptualization of what was being stated, the speaker repeated the concept. This was accomplished in two ways; the first was to repeat the statement verbatim or nearly the same way as it was originally stated. The second way was to use an entirely

different linguistic string to convey the thought. The following are excerpts from second grade students which show how students used repetition to make concepts more clearly understood.

Language Excerpt #1:

Student 1 Do you know where the spine is?

Student 2 Uh, what?

Student 1 Do you know where the spine is of a fish?

Language Excerpt #2:

Student 1 Have you seen a uh. hammer head shark.

Student 2 No.

Student 3 Uuh guy, do you know what a head looks like, like a hammer. You see, it just points out like this and uh, they have an eye here and eye here, right on here.

Language Excerpt #3:

Student 1 She still teach French, Uhm, she teaches people how to speak different languages.

Language Excerpt #4:

Student 1 There are pencils, and cups and a stapler.

Student 2 Cups?

Student 1 And\ a glass of water.

Student 2 A glass of water?

Student 1 And\ a broom, and books and I don't know what else.

(The number of excerpts in the two styles of repetition is not intended to convey frequency of occurrence.) The basal readers on the other hand emphasize word repetition. The following is an excerpt from Enchanted Gates (Harris and Clark, 1965). Each word which was wangled out for special instruction in the story is underlined.

How Many Pennies?

It was Timmy's birthday. His father said, "Timmy! You are old enough now to have money of your own. From now on, you will get ten pennies each Saturday. You may do as you like with them."

Timmy's father took the money out of his pocket. Then he counted ten shiny new pennies for Timmy.

The observation concerning conceptual repetition appears to indicate that the use of conceptual repetition might provide for a clearer understanding of written material than the present method of emphasis on word repetition.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The research project described in detail in the preceding chapters had, as an underlying interest, an analysis of redundancy as it affected reading comprehension. The following hypotheses were formulated and statistically analyzed in the present study:

1. Second grade students' ability to comprehend reading material that matches their spoken per cent of redundancy is significantly greater than their ability to comprehend material which contains the per cent of redundancy found in a basal reading series.
2. No significant difference exists between fifth grade students' ability to comprehend reading material that matches their spoken per cent of redundancy and their ability to comprehend material which contains the per cent of redundancy found in basal readers.
3. The students at both grades will indicate a preference for material which matches their spoken per cent of redundancy as opposed to a preference for material which contains the per cent of redundancy found in basal readers.

The first and second hypotheses were rejected on the basis of the data presented. The third hypothesis, which stated that students would prefer the oral passage over the basal passage at both grades, was accepted based on data presented.

Conclusions

The findings of this study suggest the following conclusions:

1. Students at both the second and fifth grades prefer written material which has been taken verbatim from oral language and placed into basal reader format.
2. Students at the second grade are able to comprehend passages taken directly from oral language and basal passages equally well when the redundancy levels are similar for the two types of passages.
3. Students at the fifth grade level are able to comprehend passages which match their oral language level of redundancy significantly better than they can comprehend passages which match the redundancy level of basal material.
4. There has been a change in the redundancy levels of some primary basal materials towards the redundancy level found in the oral language of primary age children.

5. There has been a change in the redundancy levels of some intermediate grade basals away from the redundancy levels found in the oral language of intermediate age students.

Recommendations

As a result of the findings in the present study, the following recommendations are offered.

1. The study should be repeated with a modified design to include additional groups of students at second and fifth grade levels in order to increase the number of items in each comprehension category. This modification would provide a more reliable comprehension measure and reveal any difference which may exist among the categories.
2. Further research should be carried out to ascertain oral language redundancy levels of different socio-economic groups at various age levels.
3. Investigations of students' use of conceptual repetition in their oral language should be made to better understand this phenomenon.
4. More research should be done to investigate proper length of basal stories since the topics which the subjects at early grade levels talked about generally did not exceed 250 words.

5. Teachers may augment basal readers with material garnered from language samples taken from their own classroom as a technique for further enrichment of pupils' reading experiences.
6. Samples of children's oral language for each grade should be gathered to determine current words of highest frequency.

APPENDIX A

SPEARMAN RANK ORDER CORRELATIONS
FOR PILOT STUDY

Table 16. Correlation Between the Second Grade Subjects' Performance on the Gates-MacGinitie Reading Test--Comprehension Section; and the Subjects' Performance on the Comprehension Instrument

Pupil	Gates- MacGinitie Score X	Comprehension Instrument Score Y	Gates- MacGinitie Rank R_X	Comprehension Instrument Rank R_Y	D	D^2
1	3.1	25	1.5	1.0	.5	.25
2	3.1	21	1.5	5.0	3.5	12.25
3	2.8	22	3.5	2.5	1.0	1.00
4	2.8	22	3.5	2.5	1.0	1.00
5	2.7	17	5.0	9.0	4.0	16.00
6	2.6	21	6.5	5.0	1.5	2.25
7	2.6	18	6.5	8.0	1.5	2.25
8	2.5	20	8.0	7.0	1.0	1.00
9	2.4	15	9.0	10.0	1.0	1.00
10	2.2	14	10.0	11.0	1.0	1.00
11	2.1	21	11.0	5.0	6.0	36.00
12	1.6	8	12.0	12.0	.0	.00
					$\Sigma D^2 =$	74.00

Spearman Rank Order
Correlation Coefficient (Rho) = .743.

Table 17. Correlation Between Fifth Grade Subjects' Performance on the Comprehension Section of Standardized Reading Test and Performance on Pilot Instrument

Pupil	Standardized Scores X	Pilot Study Scores Y	Standardized Rank R_X	Pilot Study Rank R_Y	D	D^2
1	6.8	20	1.0	4.0	3.0	9.00
2	6.5	19	3.0	7.5	4.5	20.25
3	6.5	19	3.0	7.5	4.5	20.25
4	6.5	21	3.0	1.5	1.5	2.25
5	6.1	19	5.5	7.5	2.0	4.00
6	6.1	20	5.5	4.0	1.5	2.25
7	5.8	16	7.0	10.5	3.5	12.25
8	5.6	21	8.0	1.5	6.5	42.25
9	5.5	20	9.0	4.0	5.0	25.00
10	5.3	19	10.0	7.5	2.5	6.25
11	4.8	15	11.5	12.0	.5	.25
12	4.8	16	11.5	10.5	1.0	1.00
					$\Sigma D^2 =$	145.00

Spearman Rank Order
Correlation Coefficient (Rho) = .497.

APPENDIX B

PROCEDURES USED TO GAIN ITEM EQUIVALENCE
ON COMPREHENSION INSTRUMENT

Table 18. Procedures Used to Obtain Item Equivalence for Second Grade Oral and Basal Segments of the Comprehension Instrument

Comprehension Category	No. of Items	No. Multiplied by	No. Correct 2nd Oral	No. Correct 2nd Basal	Equivalent Score 2nd Oral	Equivalent Score 2nd Basal
Supporting Detail	5	0.0	179	162	179	162
Sequence	2	2.5	59	67	148	168
Relationship	2	2.5	55	53	138	133
Inference	3	1.7	61	68	104	116
Main Idea	1	5.0	27	22	135	110
Making Judgments	1	5.0	40	33	200	165

Table 19. Procedures Used to Obtain Item Equivalence for Fifth Grade Oral and Basal Segments of the Comprehension Instrument

Comprehension Category	No. of Items	No. Multiplied by	No. Correct 5th Oral	No. Correct 5th Basal	Equivalent Score 5th Oral	Equivalent Score 5th Basal
Supporting Detail	5	0.0	174	151	174	151
Sequence	2	2.5	87	70	218	175
Relationship	2	2.5	58	55	145	138
Inference	3	1.7	77	75	140	128
Main Idea	1	5.0	30	32	150	160
Making Judgments	1	5.0	31	38	155	190

APPENDIX C

THE AVERAGE UNCERTAINTY FOR THE SECOND AND
FIFTH GRADE COMPREHENSION INSTRUMENTS

Table 20. The Average Uncertainty for the Letters in the
Second Grade Oral Language and Basal Passage

Second Grade Oral Sample			Second Grade Basal Sample		
Letter	Total No. in Sample	Total Per Cent	Letter	Total No. in Sample	Total Per Cent
A	2514	0.06061482	A	2030	0.06123865
B	466	0.01123568	B	414	0.01248906
C	559	0.01347800	C	476	0.01435941
D	1303	0.03141651	D	1188	0.03583818
E	3461	0.08344768	E	3238	0.09768017
F	364	0.00877637	F	310	0.00935171
G	810	0.01952983	G	540	0.01629008
H	2249	0.05422543	H	1712	0.05164560
I	2061	0.04969258	I	1595	0.04811608
J	81	0.00195298	J	85	0.00256418
K	568	0.01369499	K	541	0.01632025
L	1072	0.02584689	L	925	0.02790431
M	875	0.02109704	M	510	0.01538508
N	2026	0.04884870	N	1721	0.05191710
O	3074	0.07411694	O	2184	0.06588434
P	353	0.00851115	P	465	0.01402757
Q	11	0.00026522	Q	3	0.00009049
R	1385	0.03339361	R	1161	0.03502367
S	1839	0.04433996	S	1422	0.04289722
T	3099	0.07471970	T	2697	0.08135992
U	1258	0.03033152	U	550	0.01659175
V	211	0.00508740	V	133	0.00401218
W	948	0.02285714	W	801	0.02416362
X	22	0.00053044	X	21	0.00063350
Y	1012	0.02440023	Y	685	0.02066427
Z	17	0.00040988	Z	7	0.00021116
Blank	8798	0.21212778	Blank	6750	0.20362605
.	1039	0.02505123	.	985	0.02971432
Total	41475		Total	33149	

Table 21. The Average Uncertainty for the Letters in the Fifth Grade Oral Language and Basal Passage

Fifth Grade Oral Sample			Fifth Grade Basal Sample		
Letter	Total No. in Sample	Total Per Cent	Letter	Total No. in Sample	Total Per Cent
A	2508	0.06582504	A	2558	0.06424714
B	525	0.01377916	B	467	0.01172924
C	552	0.01448780	C	616	0.01547156
D	1375	0.03608829	D	1397	0.03508727
E	3275	0.08595575	E	4072	0.10227301
F	354	0.00929109	F	765	0.01921386
G	708	0.01858219	G	627	0.01574783
H	2025	0.05314821	H	2048	0.05143790
I	1904	0.04997244	I	1958	0.04917745
J	45	0.00118107	J	84	0.00210975
K	565	0.01482900	K	323	0.00811252
L	1034	0.02713899	L	1342	0.03370588
M	632	0.01658749	M	757	0.01901293
N	1830	0.04803023	N	2133	0.05357277
O	2622	0.06881709	O	2567	0.06447318
P	384	0.01007847	P	537	0.01348738
Q	10	0.00026245	Q	27	0.00067813
R	1239	0.03251883	R	1702	0.04274771
S	1673	0.04390960	S	2096	0.05264347
T	2734	0.07175665	T	2844	0.07143036
U	1026	0.02692842	U	863	0.02167524
V	232	0.00608908	V	251	0.00630415
W	888	0.02330647	W	821	0.02062037
X	16	0.00041993	X	38	0.00095441
Y	967	0.02537991	Y	735	0.01846038
Z	11	0.00028870	Z	29	0.00072836
Blank	7890	0.20708118	Blank	7609	0.19110887
.	1077	0.02826697	.	549	0.01378877
Total	38101		Total	39815	

APPENDIX D

THE SECOND AND FIFTH GRADE COMPREHENSION
INSTRUMENTS

Second Grade Comprehension Instrument

NAME _____

DIRECTIONS:

There are two stories and two sets of questions. Read the story on the next page. After you have read the story, answer all of the questions that come after it. Do not look back at the story while you are answering the questions. After you have completed the first story and questions, go on and read the second story and answer the questions.

Before you read let's do a sample question so that you know how to answer the questions. Look at the sample question. Under the question are four possible answers. Draw a line under the right answer. Now try the sample question.

X) Christmas day is on:

- 1) February 13th
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- 3) December 31st
- 4) December 25th

That's right. Christmas is on December 25th. You should have put a line under December 25th.

Each question after the story should be answered in the same way as the sample question. Remember, pick the one best answer for each question. Do not look back at the story while you are answering the questions.

Are there any questions?

Now turn the page and begin reading.

"Oh, Mother!" said Betsy. "There's a little girl in the other bed in my room. I have never seen her before!"

Before her mother could answer, Star came running into the room.

"Mother!" she cried. "A little boy is hanging upside down out of the top of my bed!"

Their mother laughed.

"Yes," she said. "They are Neddie and Susan. Their mother is here, too. They came home with your father last night. Their car had stopped in the snowstorm, and they couldn't get home. Father's car stopped, too. They all had to walk a long way to get here."

"Will they go home this morning?" asked Betsy.

"They can't go until this bad storm is over," her mother answered. "They can't even telephone home. All the telephone wires are down. We must be very kind to Neddie and Susan and their mother."

"Oh, we will!" said Betsy. "We like having them here. It won't be so bad to stay inside if we have someone to play with us. Come on, Star. Let's go see Neddie and Susan."

The snowstorm kept on for days. The children played everything they knew how to play. They liked to play together, but it was hard to stay inside so long. They couldn't even look at TV. There was no electricity to run it.

One morning Neddie looked out and said, "Still storming! We can't go out today." Then he turned to Betsy. "What can we do now?" he asked.

"Let me think," said Betsy. "Oh, I know! Maybe we can pop some popcorn. We have a new popper."

Go on and answer questions on next page.

- A) The snowstorm lasted for:
- 1) a month
 - 2) a week
 - 3) many days
 - 4) one day
- B) How many people came to stay with Star?
- 1) Neddie
 - 2) Neddie and Susan and Steve
 - 3) Susan and Meddie and their mother
 - 4) Susan and Steve
- C) The popcorn popper was:
- 1) old
 - 2) electric
 - 3) new
 - 4) made out of glass
- D) How many times had Betsy seen the girl in her room?
- 1) Every Friday during Girl Scouts.
 - 2) Never before.
 - 3) Once before at a party.
 - 4) Once before at a picnic.
- E) Star ran to her mother and said that a little boy was:
- 1) playing jacks in her room.
 - 2) hanging upside down on her bed.
 - 3) rolling a ball down the hall.
 - 4) playing with her dolls.
- F) What did the children do after a while?
- 1) They watched TV.
 - 2) They read books.
 - 3) They sang songs.
 - 4) They got the popcorn popper out.
- G) How did the children get from their car to Star's home?
- 1) A policeman took them home.
 - 2) They took the train.
 - 3) They walked to Star's home
 - 4) Father brought them home in his car.

Go on to next page.

- H) Why couldn't the children look at TV?
- 1) The T.V. was broken.
 - 2) There was no electricity.
 - 3) The snow made the picture bad.
 - 4) The T.V. was at the shop being fixed.
- I) What is a good title for this story?
- 1) Snowstorm Visitors
 - 2) Father's Friends
 - 3) Winter Fun
 - 4) A New Popcorn Popper
- J) Why had the children come to stay with Star?
- 1) Star was their cousin.
 - 2) It was their vacation time.
 - 3) They had to because of the snowstorm.
 - 4) It was snowing where they lived so they went to Star's home where the sun was shining.
- K) When did Betsy and Star first see the children?
- 1) In the morning
 - 2) At lunch time
 - 3) In the afternoon
 - 4) Late in the evening
- L) The children probably:
- 1) called their father who was at home.
 - 2) wrote their father a letter.
 - 3) did not call or write because the storm was too strong.
 - 4) asked someone who was driving by to take a note for them.
- M) The children and Betsy and Star:
- 1) did not like each other.
 - 2) got tired of playing with each other.
 - 3) liked to play with each other.
 - 4) each played in a different room.

Go on to next page.

N) What is the main idea of this paragraph?

"Oh, we will!" said Betsy. "We like having them here. It won't be so bad to stay inside if we have someone to play with us. Come on, Star. Let's go see Neddie and Susan."

- 1) That Betsy and Star wanted some friends to play outside with.
- 2) That Betsy and Star didn't have any friends until the children came.
- 3) That Betsy and Star were glad to have friends while the storm lasted.
- 4) That Betsy's and Star's other friends couldn't come to their house.

"Hey!" Bill said, "Let's tell all of the ghost stories we know."

"Hey yeah, good thinking," yelled Jane.

"Hey, we better shut the lights off before we tell-um," answered Tom.

"That thing would go off if the lights would go off," Jane said.

Then Bill said, "I'll tell, I'll tell you this one. Now this, this um hotel. And um, see this guy came in. And this monster that lived in a zoo, and every night he would sneak out of the zoo. And he would go in this room and knife you, see.

And this one guy came in and said, "Hey man, I want a room."

"There is no room left except room nine, but it's haunted."

"I'll take room nine; I just won nine dollars."

So he takes it and he jumps out of the window that night because that monster scares him.

And this monster was a hairy monster, and he said, "I'm the monster, I'm the hairy monster."

And he jumped out the window. And he kills himself so this other guy comes in.

He says "I want a room, boy." And he says, "There are no rooms left except room nine, it's haunted."

"Oh boy, that's my lucky number." And he, so he goes in there and he says, and he, that monster says again, "I'm the hairy monster."

So this hippie comes and he says, "Man, I need a room, quick too."

So he goes, "No rooms left except room nine."

"Hey ya, I like room nine. I dig with that groove, come on give me it." But, and so, he gives him it. But, and so he hears that night, "I'm the hairy monster."

And he says, "Hey man like get a shave." "Get it-- hey like man get a shave."

Go on and answer the questions on the next page.

- A) During the day the monster lived in a:
- 1) Park
 - 2) Cage
 - 3) Zoo
 - 4) Playground
- B) What kind of a monster was it?
- 1) A fat monster
 - 2) A hairy monster
 - 3) A purple monster
 - 4) An ugly monster
- C) The number of the room that was haunted was:
- 1) Seven
 - 2) Twenty-nine
 - 3) Six
 - 4) Nine
- D) What did the monster do when he got out of the zoo?
- 1) He went to the park.
 - 2) He had dinner.
 - 3) He would knife people.
 - 4) He went to the city.
- E) The last person to rent the room was a:
- 1) Cowboy
 - 2) Hippie
 - 3) Lady
 - 4) Farmer
- F) Why did the guy jump out of the window?
- 1) He fell out while he was cleaning the window.
 - 2) He thought that the building was on fire.
 - 3) The monster scared him.
 - 4) The monster pushed him.
- G) Why did the man say that he would take room nine?
- 1) He had just won nine dollars.
 - 2) He wanted to have the room on the top floor.
 - 3) Room nine only cost nine dollars a night.
 - 4) The man wanted to stay for nine nights.

Answer the questions on the next page.

- H) What did the hippie say after the monster said, "I'm the hairy monster."
- 1) I'm afraid so I will lock the door.
 - 2) Hey man, like get a shave.
 - 3) Help, somebody save me.
 - 4) Like I'm getting out of here, fast.
- I) What is a good title for this story?
- 1) The Lonely Hotel
 - 2) The Monster and the Haunted Hotel
 - 3) A Ghost Town
 - 4) Some Rooms for Rent
- J) What is the main idea of the next three lines?
"And this monster lived in a zoo, and every night he would sneak out of the zoo and he would go in the room and knife you, see."
- 1) It is about animals that live in the zoo.
 - 2) It is about monsters that live in the zoo.
 - 3) It is about the monster who snuck into rooms at night.
 - 4) It is about the monster who rented a room.
- K) Why did the hippie say, "Hey man, like get a shave."
- 1) Because the hippie was dirty.
 - 2) Because the monster was hairy.
 - 3) Because the hippie needed a haircut.
 - 4) Because the monster didn't comb his hair.
- L) From the story, do you think that the monster was:
- 1) Kind
 - 2) dangerous
 - 3) old
 - 4) yellow
- M) From the story, do you think that:
- 1) A lot of people went to the hotel
 - 2) Only a few people went to the hotel
 - 3) The hotel was by the ocean
 - 4) The hotel was very new

Answer the questions on the next page.

N) Room nine was:

- 1) not really haunted. Bill was just telling a ghost story.
- 2) really haunted because Bill said that monsters went into it.

Fifth Grade Comprehension Instrument

NAME _____

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"I've got my orange badge from Webelos," said Bill. "I'm going to get my sportsman." "What are you, Webelos?" Tom asked. "Yeah," replied Bill. "When are you going to be a cub?" Tom asked. "The eleventh," said Bill. "Cub?" "I mean a, uh, scout," returned Tom. Then Bill said, "March 11th; I'm getting my sportsman and I only had two things to do; and I did them both." "Who is your den mother?" said Fred. Bill replied, "Miss, Mrs. Thomas."

"Our pack is going to go up to the mines; I forget which mine it is," said Fred. "San Manuel?" Bill asked. "I don't know" said Fred. Bill asked again, "Green Valley?" "I forget, I don't think, I don't know," returned Fred. Then Bill said, "Well you'll see, if you go up to the mines and it's San Manuel, you're going to see this red rock, man, every, the whole everything there is red."

"You been to Old Tucson?" asked Tom. "Yeah," said Fred. "It's cool." "Did, did you go to that thing, fifty cents you got to pay to get in there, and um they show you how, they show you the tricks and everything?" said Tom. "One, I didn't do it," replied Fred.

Then Tom said, "Which one did you see?" "A gunfight with um, guys, a guy fell off of the roof," replied Fred. "Yeah," Bill said. "I saw that, that's cool," said Tom. "Did, did they catch him?" asked Bill. "No, he slipped off." said Fred. Then Tom said, "No, no he got shot, then he fell on the roof, and then he shot him again and then he

rolled down and; . . ." "Yeah," said Bill. "The roof of the doctor's building?" questioned Tom. Fred replied, "Yeah, the doctor's building." "Yeah, that was fake," Tom stated. Bill said, "I know it." Tom stated, "Yeah, the dead man's trick. See, like, he fell off a horse that's about so high. And uh, it smacked him and everything. Did you see that one?" Fred said, "No. I only saw one, no, I only saw two of them. One was a guy and he's in the cavalry. You know he comes riding into town and he, the sheriff of the town is the brother of him. And this guy kills his brother, and he goes o-h-h-h, o-h-h-h; then the cavalry guy gets up and he shoots the guy who was standing there." "Yeah, man, he was a great big fat guy," stated Tom. "Yeah," replied Fred.

"See High Chaparral place?" said Tom. "Yeah, that's cool" replied Fred. "Then you see an old church, and you see the old cannon?" said Tom. Fred said, "Yeah." "Did you see the big thing you can move it around and everything?" stated Tom. "Yeah," answered Fred. "You know on those old cars, with the carriage and things, you have to steer yourself. Did you go on-em?" said Tom. "Um-hum" said Fred. Then Tom said, "Did you steer yourself?" "I went on the car too," said Fred. Then Bill said, "I might go to that 'Old Tucson' sometime while we are near there. I've

rode around it alot of times." Then Tom said, "It's a lot of fun. You ought to go there."

Go on and answer the questions on the next page.

- A) On which day was David going to become a scout?
- 1) February 13
 - 2) March 11
 - 3) April 10
 - 4) September 11
- B) Who is David's den mother?
- 1) Mrs. Smith
 - 2) Mrs. Trager
 - 3) Mrs. Thomas
 - 4) Mrs. Treman
- C) The sheriff's brother was:
- 1) a doctor
 - 2) the deputy sheriff
 - 3) a cavalryman
 - 4) a rancher
- D) What happened to the gunfighter after he was shot?
- 1) He fell off his horse and was shot again.
 - 2) He fell off the roof and some people came and helped him.
 - 3) He fell off the roof, was shot again, and rolled down.
 - 4) He fell off the roof, was shot again and some people came to help.
 - 5) He fell off his horse, was shot again and then he rolled down.
- E) What did Bill say that the scout pack would see when they got to the mines?
- 1) a mountain of rocks
 - 2) a large piece of copper
 - 3) a large piece of red rock
 - 4) red rock and copper
- F) Why did Tom say, "That was fake," when he was talking about the man who got shot?
- 1) The guy really got shot and used the dead man's trick so that he wouldn't get shot again.
 - 2) Nobody really got shot, the men were actors and were using the dead man's trick.
 - 3) The man who got shot was really a dummy so they called it the "Dead man's trick."
 - 4) Both 2 and 3 are the answer.

- G) What is the story about?
- 1) Some people who went to Old Tucson
 - 2) Some cub scouts and a trip they took
 - 3) A field trip that some fifth graders took
 - 4) A trip that three boys took last summer
- H) Why did the cavalry guy shoot the other guy?
- 1) The other guy shot his brother
 - 2) The other guy shot another guy who was standing in front of the store
 - 3) The other guy shot the sheriff
 - 4) Both 1 and 3 are correct
- I) How many of the boys had visited "Old Tucson"?
- 1) one
 - 2) two
 - 3) three
 - 4) the story doesn't tell
- J) When David said that he was getting his "Sportsman," what did he mean?
- 1) That he was trying to be a better sport at school.
 - 2) That he was good at sports and had won a trophy.
 - 3) That he was given an award in scouts for making the longest hike.
 - 4) That he had completed all of the requirements for his "Sportsmanship" badge in scouts.
- K) What kind of a building did the man fall off of?
- 1) A large stable
 - 2) A general store
 - 3) A restaurant
 - 4) none of these
- L) Why did Bill think that he would like to go to "Old Tucson" sometime?
- 1) Because he thought "Old Tucson" would be a fun place to visit.
 - 2) Because his friends had been there, but he hadn't.
 - 3) Because he had nothing better to do and they were near there.
 - 4) Because his friends had told him that it was a good place to visit.

- M) What statement best describes the relationship among the boys?
- 1) They were polite and friendly, but not enthusiastic when they spoke.
 - 2) They seemed to be good friends who enjoyed telling about experiences in an enthusiastic way.
 - 3) Although each boy was enthusiastic when talking, the other boys didn't seem to be interested in listening.
 - 4) The boys were good friends who liked to tell about their experiences to each other, although each boy tried to make his experiences sound more exciting than the experience of the other boys.
- N) The boys in the story are like many fifth grade boys because:
- 1) They could go to places like "Old Tucson" because they had a lot of money.
 - 2) They enjoy scouting and visiting exciting places and telling about it.
 - 3) They like to pal-around together in pairs.
 - 4) They like telling stories of their experiences to each other.

Go on--Read the second story.

Joseph Pulitzer became concerned about a stone goddess. He had stumbled across a disgraceful secret that was kept from the public. The people of France had raised thousands of dollars and had paid the famous sculptor Auguste Bartholdi to create a great statue of Liberty as their gift of friendship to America. The statue was finished. It lay, still crated, gathering dust in a French warehouse. Year after year the American Congress refused to raise the money necessary for building the pedestal to hold the great goddess. The pedestal was to be built on Bedloe's Island, an island at the entrance to New York Harbor. From here, the torch of the stone goddess might be seen by every ship arriving in New York.

Joseph was determined to rescue the stone goddess from her plight. He issued an appeal through the pages of his newspaper, the World:

"Money must be raised to complete the pedestal for the Bartholdi statue. It would be a disgrace to New York City and the American Republic to have France send us this splendid gift without our having provided even so much as a landing place for it. The World is the people's paper, and it now appeals to the people to come forward and raise this money. The \$250,000 that the making of the statue cost was paid by the masses of the French people--the workmen, the clerks, the storekeepers, the artists--by people of all classes. Let us respond in like manner. It is not a gift from the rich people of France to the rich people of America but a gift from all the people of France to all the people of America"

The response was electric, unheard of. Money poured into the World offices. It took time. A lot of pennies and

nickels and dollars were needed, but--finally--on August 11, 1886, the story broke in headlines in the World that \$100,000 had been collected. The goal had been reached.

Now, as the statue was loaded onto a French ship for its long voyage, the people of America knew that the "Statue of Liberty" was coming because they had made it possible--they and Joseph Pulitzer.

As Pulitzer stood with officials of the city and the nation at the welcoming ceremony on October 28th, he felt both proud and humble. It was a crowning moment for the man who had come here as a penniless immigrant only a few years before. In raising money to help build the base for the Statue of Liberty, Pulitzer had found a perfect way to repay his adopted country for all it had offered him.

Pulitzer's heart swelled with pride as he gazed at the stone goddess, with her torch of freedom raised high, and read the lines of Emma Lazarus on the pedestal promising liberty and justice to all.

GIVE ME YOUR TIRED, YOUR POOR,
YOUR HUDDLED MASSES YEARNING TO BREATHE FREE,
THE WRETCHED REFUSE OF YOUR TEEMING SHORE,
SEND THESE, THE HOMELESS, TEMPEST-TOSSED, TO ME:
I LIFT MY LAMP BESIDE THE GOLDEN DOOR.

Go on and answer the questions on the next page.

- A) What is a good title for this story?
- 1) Gifts to Americans
 - 2) A Man Who Cared About Liberty
 - 3) How A Newspaper Works
 - 4) How We Got the Statue of Liberty
- B) The statue was built in what country?
- 1) France
 - 2) Austria
 - 3) Netherlands
 - 4) Germany
- C) Who paid for the statue to be made?
- 1) Aristocrats
 - 2) Workingmen
 - 3) The King
 - 4) The Prime Minister
- D) What happened after Pulitzer heard about the secret?
- 1) He kept it a secret.
 - 2) He told about it in his newspaper and asked for money.
 - 3) He asked his personal friends for money.
 - 4) He told about it in his newspaper and said that the statue should stay where it was.
- E) Why do you think that the people gave so much money to build the pedestal for the statue?
- 1) Because it would be rude to the European people to leave the statue in storage.
 - 2) To make New York City more beautiful.
 - 3) Because they felt that they wanted to pay America back and that the statue was a great honor for America.
 - 4) Both 1 and 3 are correct.
- F) How much money was needed before the goal could be reached?
- 1) \$10,000
 - 2) \$75,000
 - 3) \$100,000
 - 4) \$250,000

- G) What is the name of the lady who wrote the words for the Statue of Liberty?
- 1) Clara Barton
 - 2) May Lazar
 - 3) Emma Lazarus
 - 4) Yvonne Lofthouse
- H) What happened after Pulitzer issued the appeal in the newspaper?
- 1) Many people sent money, but it wasn't enough.
 - 2) The Congress finally said it would pay the rest of the money.
 - 3) Pulitzer donated \$100,000 himself.
 - 4) Many people sent money and the goal was finally reached.
- I) Why did Pulitzer feel both humble and proud at the welcoming ceremony?
- 1) He had found a way to repay his adopted country.
 - 2) It was a crowning moment of a man who once was a penniless immigrant.
 - 3) He had proven that Americans had many European friends.
 - 4) Both 1 and 2 are correct.
- J) Why did Pulitzer's heart swell with pride when he read the words on the pedestal?
- 1) They reminded him of his old home in Austria.
 - 2) They reminded him of how much America had meant to him and the other immigrants like him.
 - 3) They reminded him of the many hardships that he had endured before he became rich.
 - 4) Probably 1, 2 and 3 are correct.
- K) The Statue of Liberty is important to Americans because:
- 1) It is a beautiful statue.
 - 2) It was given to us by the people of a foreign country.
 - 3) It represents liberty and a new start in life for all Americans, but especially immigrants.
 - 4) All of the people on ships who see it will know that they have finally arrived in America.

- L) What was the disgraceful secret that was kept from the public?
- 1) That too many poor people had given money to build the statue.
 - 2) That a statue for the people of America was in a warehouse because there was no money for a place to put it.
 - 3) That the American congress refused to build the pedestal to hold the stone goddess.
 - 4) Both 2 and 3 tell the secret.
- M) Why did the poor respond so generously to Pulitzer's plea for money?
- 1) Most of them were immigrants and felt that the statue was a symbol of the freedom and opportunity that they had found in America.
 - 2) They admired and respected Pulitzer and wanted to help him.
 - 3) They thought that there needed to be something pretty in New York Harbor for foreign visitors to see.
 - 4) Most of them had come from Europe and they wanted to honor the sculptor of their native land.
- N) What does the line "Your huddled masses yearning to breath free" mean?
- 1) New York City was too crowded and polluted.
 - 2) That the people who came from other countries wanted a lot of land.
 - 3) That the immigrants had too little land in Europe and lived in crowded houses.
 - 4) That America was a country which wanted and nourished the un-wanted people from other lands.

Stop--Close your booklet.

APPENDIX E

THE ITEMS BY COMPREHENSION CATEGORY FOR THE SECOND
AND FIFTH GRADE ORAL AND BASAL SEGMENTS

Category		Second Grade		Fifth Grade	
		Oral	Basal	Oral	Basal
Supporting Detail	1.	A	A	A	B
	2.	B	B	B	C
	3.	C	C	C	F
	4.	E	D	H	G
	5.	G	E	K	L
Sequence	1.	D	F	D	D
	2.	H	G	E	H
Relationship	1.	F	K	F	I
	2.	K	J	L	M
Inference	1.	J	K	I	E
	2.	L	L	J	J
	3.	M	N	M	N
Main Idea	1.	I	I	G	A
Drawing Conclusions	1.	N	M	N	K

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