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ASSESSING THE DIFFICULTY LEVEL OF STUDENT-AUTHORED MATERIALS
IN THE PRIMARY GRADES: VOCABULARY AND SENTENCE STRUCTURE
PROCEDURES FOR CLASSROOM USE

by
Margaret Grace Ver Velde

A Dissertation Submitted to the Faculty of the
DEPARTMENT OF ELEMENTARY EDUCATION
In Partial Fulfillment of the Requirements
For the Degree of
DOCTOR OF EDUCATION
In the Graduate College
THE UNIVERSITY OF ARIZONA

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GRADUATE COLLEGE

I hereby recommend that this dissertation prepared under my
direction by Margaret Grace Ver Velde
entitled ASSESSING THE DIFFICULTY LEVEL OF STUDENT-AUTHORED
MATERIALS IN THE PRIMARY GRADES: VOCABULARY AND
SENTENCE STRUCTURE PROCEDURES FOR CLASSROOM USE
be accepted as fulfilling the dissertation requirement for the
degree of DOCTOR OF EDUCATION

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Dissertation Director

July 7, 1976
Date

As members of the Final Examination Committee, we certify
that we have read this dissertation and agree that it may be
presented for final defense.

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Edward J. Bowers

July 7, 1976
July 7, 1976
7/7/76

Final approval and acceptance of this dissertation is contingent
on the candidate's adequate performance and defense thereof at the
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SIGNED: Margaret Grace Van Valde

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ABSTRACT

The purpose of the study was to develop procedures for use by classroom teachers in ranking the reading difficulty level of student-authored materials in the primary grades. Two procedures were developed: The Word Procedure for assessment of reading difficulty levels of vocabulary, and the Two-Four Procedure for assessing reading difficulty level of sentence structure.

Rationale for development of the Word Procedure was related to the distinction between form class and structure words, and to the concept of word frequency. The Two-Four Procedure was based upon the rationale that the deeper the main elements of a sentence were buried within that sentence, the more difficult it would be to read.

Both procedures were evaluated for validity according to the standard of six levels of reading passages from the Gilmore Oral Reading Test. Rankings of passage difficulty produced by the two procedures correlated significantly with test publisher's rankings.

In the evaluation of reliability and practicality of the procedures it was found that rankings provided by the Word Procedure were more reliable than rankings provided by the Two-Four Procedure. The Word Procedure also was judged

to be more practical than the Two-Four Procedure in terms of ease of scoring and interpretation.

Because evaluation of the Word Procedure indicated that it was more reliable and practical than the Two-Four Procedure, it was decided to subject just the Word Procedure to further evaluation of validity for predicting the reading difficulty level of stories written by children for other children to read.

Four student-authored stories, varying in length and in Word Procedure rankings of difficulty, were chosen from among collections of children's writing. Twenty second-grade children read the four stories, and their comprehension was assessed by an analysis of their spontaneous retelling of the stories.

Mean retelling scores for the story judged easiest to read by the Word Procedure were significantly higher than scores for the story judged most difficult. For the two stories ranking midway between the easiest and most difficult and differing in terms of length, significant differences in mean retelling scores indicated that children understood the longer story much better than the shorter one. It was concluded that the Word Procedure could be useful in predicting reading difficulty level of student-authored materials if stories being ranked were approximately equal in length.

Readers were also asked to rank the four stories from easiest to most difficult. Their rankings agreed with Word Procedure rankings of reading difficulty and with mean retelling scores obtained for each story.

An analysis of misconceptions related in the course of children's retellings indicated that the sample story which was written in the first person generated a disproportionate number of misconceptions, all related to confusion about who was telling the story. Readers' misconceptions appeared to have minimal effect upon their understanding of the main ideas inherent in the stories.

Limitations of the Word Procedure were related to the variable of story length and to the leveling-off of scores at a 3.5 level.

Results of the evaluation of the Word Procedure indicated that this procedure could be a useful tool for teachers in selecting and ranking the reading difficulty level of student-authored materials for use in the classroom reading program. It also was suggested that the Word Procedure could have applications to teacher education, because the procedure provides a linguistic rationale for examining relationships among high-frequency structure words and content-bearing form class words in student-authored materials.

CHAPTER 1

INTRODUCTION AND REVIEW OF LITERATURE

Introduction

"Writing is, in relation to the whole of man's history, a comparatively modern invention" (Schlauch, 1955, p. 36). Ever since humans first decorated their caves with designs, man has been engaged in a two-way affair with written symbols. He is either producing them or trying to decipher them. Writing, however, does not occur by itself. Speech, as well as writing, gives man the opportunity to communicate what is going on in his mind. Vygotsky (1962, p. 56) describes words as "mediating signs" through which an idea is understood and expressed. Postman and Weingartner (1966, p. 176), in discussing the interrelationships among language behaviors, identify as a primary problem in learning how to read "the correlation of speech with the symbols that are used to represent speech."

Schools have been given the responsibility of helping children bridge the gap between speech and print. In primary grade educational programs where interrelationships among thought, speech, and writing are emphasized, reading instruction may depend upon the production, by student authors, of a great deal of the material which is

used in the classroom. Whether dictated or written independently, these stories are used not only as springboards for the study of vocabulary, sentence structure, punctuation, and spelling; but also as reading material for the authors and their classmates (Allen, 1976, p. 182).

In carrying out these programs a teacher needs to evaluate student-authored materials in terms of how easy or difficult they may be for other children to read. Assessment procedures are required which (1) are specifically applicable to reading material produced by primary grade students, (2) take into consideration both the vocabulary and sentence structure elements in language, and (3) are easy for a classroom teacher to score and interpret. This study will deal with the development and testing of such procedures.

Review of Literature

Relationships Between Spoken and Written Language

There is a growing body of research and literature in support of the educational rationale that listening, speaking, writing, and reading are complementary human behaviors. Loban (1963, p. 69) conducted a longitudinal study of the language of children in kindergarten and the first six years of elementary school, concerning himself with written and spoken communication, listening, and reading.

At the end of a seven-year period, Loban reported that he had found positive interrelationships when he compared oral language with written language and oral language with reading.

Relationships between oral language and reading were also highlighted by Strickland (1962) in a study of the language of elementary school children and its relationship to the language of reading textbooks. Research results supported a major hypothesis of her study: that "relationship exists between the language used by children and the skill they demonstrate in learning to read" (p. 71).

O'Donnell, Griffin, and Norris (1967, p. 95) in their study of the syntax of elementary school children, investigated the relationship between children's speech and their independent writing. They found that primary-grade children showed greater syntactic skill in speaking than in writing, but as children progressed through the grades their written language became more complex syntactically than their oral language.

The three research projects quoted above have a common element. That element is the detailed measurement of oral and written language.

Because this study deals with the assessment of the reading difficulty level of vocabulary and sentence structure of stories dictated or written by children, an investigation into various methods of language assessment was

necessary. The following section describes two major categories of measurement instruments: (1) language assessments especially designed for research projects and/or clinical use; and (2) traditional readability formulas, designed to assess the reading difficulty level of written materials.

The first category deals with theories of language development, transformational grammar, and linguistics. The measurements include some complex systems of syntactic and semantic analysis. Although the "big ideas" which shape these measures are crucial issues in language assessment, the techniques have had limited application in evaluative processes carried out in elementary school language arts and reading programs.

Readability formulas, however, have had a great deal of application in elementary schools. These measures have been used by curriculum planners, textbook evaluators, and committees of reading teachers.

Research-Oriented Language Measurements

In this portion of the review of literature, three examples of research-oriented measurement techniques will be described and compared. Table 1 provides an overview of the attributes of these assessment techniques: (1) T-units, (2) Developmental Sentence Analysis, and (3) Design of Discourse.

Table 1. An Overview of Research-Oriented Language Measurements

Name of Measurement	Type of Language Analysis	Syntactical and/or Semantic Elements	Purpose or Intent	Attributes and Applications
T-Units (Hunt)	One main clause and all subordinate clauses attached to it.	Syntax	To measure degree of syntactic complexity of spoken and/or written language.	Research-- applied to children's oral and written language.
Developmental Sentence Analysis (Lee)	(1) Four types of sentence transformations (2) Semantic relationships.	Syntax and semantics	To measure children's oral language.	Clinical use-- Normed for ages 6-10.
Design of Discourse (Hanf)	"Cognitive Units"; (Subdivisions of communication units) are mapped on a diagram.	Syntax and semantics	To measure "cognitive thrust" of children's oral language.	Research-- Application of a model of verbal behavior.

The T-Unit or "minimal terminable unit" is perhaps the most widely used in research related to spoken and written language of elementary school children. Hunt (1961, p. 21) used the T-Unit in a study of syntactic maturity of elementary school children and adults to count the number of sentence-combining transformations per main clause in writing and speaking. The T-Unit was also used by O'Donnell et al. (1967, p. 35) in their longitudinal study of written and spoken language of school children.

To obtain a T-Unit statistic the researcher identifies and sets apart with slash marks each independent clause, together with any subordinate clauses to which it may be grammatically related. Then the mean number of words per T-Unit is computed, yielding the final statistic. The following passage contains two T-Units:

/A black puppy, her tail wagging, greeted us at the door./She barked and whimpered./

$$\text{Mean length of T-Unit: } \frac{11 \text{ words} + 4 \text{ words}}{2 \text{ T-Units}} = 7.5.$$

The T-Unit has not been used for readability assessment, although it is distantly related to the average sentence length factor which is part of traditional readability formulas.

Lee's (1974, p. xix) Developmental Sentence Analysis is a "detailed, scored evaluation of the child's use of standard English." Lee (pp. 20-27) combines a transformational grammar approach with a variety of semantic

considerations. This measure is intended solely for the use of speech clinicians. The three sentences which follow illustrate scoring of various forms of the main verb play.

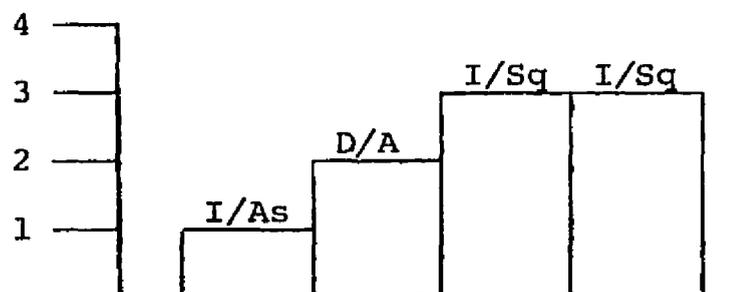
I play. Score: 1 (no transformation)

I don't play. Score: 4 (transformation: do + negative)

Does he play? Score: 6 (transformation: does + question)

The "Design of Discourse" measure represents an innovative attempt to combine major ideas of language analysis into a package. Oral language of children is classified into "cognitive units" which have the following functions: "describes, reiterates, responds, initiates, inquires, assumes, suggests, predicts, summarizes, judges, and revises" (Hanf, 1973, p. 19). Then a "Design of Discourse" diagram is constructed which graphically represents not only the kinds of cognitive units but also the "main topic units and levels of modification present in the language sample" (Hanf, 1973, p. 20).

An example of the "Design of Discourse" diagram is provided below:



The diagram represents a picture of a single communication unit uttered by a child. The speaker began by introducing a main topic (level 1), added a modification (level 2), and then completed the response with two units modifying the previous unit (level 3). Code letters written above the blocks indicate that "the intent of the discourse was to assume, describe, and suggest information, primarily on an interpretive level" (Hanf, 1973, p. 20). Hanf acknowledges that this pilot work is subject to many revisions.

The three language measurement techniques described range from standardized, commonly-used syntactic measurements such as the T-Unit to innovative measures such as the "Design of Discourse." These measures are of limited use for the classroom teacher who is interested in assessing the reading difficulty level of vocabulary and sentence structure in student-authored materials. The T-Unit measures only syntactic elements, and is not designed to assess children's stories in terms of how easy or difficult these stories might be for other children to read. "Developmental Sentence Scoring" measures oral language development and is not intended for use with written materials. It also involves a complex scoring process which restricts its classroom use. Hanf's "Design of Discourse" is applicable to spoken and written language, and also includes syntactic and semantic considerations. However, it is not designed to assess student-authored materials in terms of readability,

and the process of language analysis which is required is lengthy and detailed.

Readability Measurements

The research-oriented language measurements just described have had limited application for educators for classroom use. In the schools, language measurement of written materials has been confined mainly to readability scales.

Table 2 presents an overview of the nine measures of readability, ranging from older, more traditional formulas to more recent developments in readability assessment

Klare (1968, p. 17) states that word difficulty and sentence difficulty are the two variables most often used in readability formulas. This observation applies to each measure shown on the table.

The Lorge, Spache, and Dale-Chall formulas are similar, in that they all measure word difficulty by referring to word lists. The Lorge (1959, p. 5) and Spache (1953, p. 410) measures both use the Dale list of 769 Easy Words to determine word difficulty.

Dale and Chall (1948, p. 27), in developing their measurement instrument, used the "Dale List of 3,000 Familiar Words" to determine word difficulty. The list was constructed by testing fourth-graders on their knowledge in reading of a list of approximately 10,000 words. A word

Table 2. An Overview of Readability Measures

Name of Readability Scale	Syll. per 100 Wds.	Average Sentence Length	Word Classifications					
			"Hard" vs "Easy"	Form Class vs Structure	Letters in a Word	Frequency	Syntax	Semantic
Lorge		yes	Dale List of 769 Easy Wds.		(Barker & Stokes revision) substit. for Dale 769 List		Prep. phrases	
Spache		yes	Dale List of 769 Easy Wds.					
Dale-Chall		yes	Dale List of 3,000 Familiar Words					
Flesch	yes	yes	Personal Wds. (for human interest score)					
Fry	yes	yes						
Fog (Gunning)	yes	yes						
Cloze (Taylor)								Words deleted.
Noun Frequency (Elley)				Nouns scored.		Less frequent higher value		
Dawkins (proposed)								Pre-nominals and post-nominals

was considered known when at least 80 per cent of the fourth graders checked it as known (Dale and Chall, 1948, p. 16).

These three formulas (Lorge, Spache, and Dale-Chall) all deal with the variable of sentence difficulty through a computation of average sentence length, Lorge (1959, p. 14) assesses sentence difficulty through a count of prepositional phrases in his formula.

Flesch (1974, p. 250), Fry (1968, p. 513), and Gunning (1968, p. 34) (Fog Index) also measure sentence difficulty by average sentence length, although they discard the use of word lists as a measure of word difficulty. Instead, the Flesch, Fry, and Fog Index formulas include a count of syllables per hundred words to measure vocabulary level.

The readability formulas just described all combine a word-difficulty score with a sentence-difficulty score to arrive at one single statistic. This procedure is seen as a drawback by Bormuth (1968, p. 429) who states that this combination "makes . . . [the measures] unsuitable for use as readability prediction formulas." As he points out ". . . it is a simple matter to write long or short sentences using words of any length we choose" (p. 430).

Kingston and Weaver (1967, p. 46) have also criticized the major readability formulas in terms of their validating procedures. They point out that many of the

formulas were judged to be valid on the basis of how closely they correlated with each other.

The last three measures on the table deal with word difficulty and/or sentence difficulty in ways that are dissimilar to the first six formulas just described.

Taylor's (1953, pp. 415-433) Cloze Procedure consists of deleting every fifth word from a passage, then asking children to read the passage and write in the blanks the words they think were deleted. Taylor's initial work with this procedure is described in the article "Cloze Procedure: A New Tool for Measuring Readability."

Bormuth (1971, p. 492), in a report of research on the Cloze Procedure, mentions two major applications of the technique. First, it may be used to place students in graded material; and second, it can be used to select materials for a group. It is this second application which puts it in the category of a readability procedure. In the material selection process school texts are evaluated in terms of how well a sample of children in the class perform on cloze tests over portions of the texts. In a class where all students use the same text, this is a valid application of the cloze procedure. Neither Taylor nor Bormuth has implied that the procedure should be used to evaluate student-authored materials, nor do they claim that it provides a direct measure of vocabulary and sentence structure factors.

Another departure from the traditional two-part formula is Elley's (1969, p. 413) "Noun Frequency Method." Elley's approach consists of ". . . identifying the nouns used in the passage to be rated, classifying them according to their frequency in children's writing, and determining the average frequency level of those nouns." He reasons that nouns carry the greatest meaning load, and are thus crucial to getting sense from print (Elley, 1969, p. 421). In order to determine frequency, Elley uses a graded list of nouns that occur most frequently in school journals and graded readers in New Zealand. The Elley method, then, measures vocabulary difficulty through noun frequency.

The last assessment method listed on the table deals with the sentence difficulty problem in a unique manner. Dawkins (1975, p. vi) in his book Syntax and Readability discusses the effects of the various sentence transformations upon readability. He then poses a question: might readability of a passage be assessed by a consideration of prenominals (words that come before the subject) and postnominals (words which come after the subject)? The postnominals that Dawkins (1975, pp. 41-42) considers especially important to a measure of syntactic difficulty are those which intervene between the subject of a sentence and the verb. This pre- and postnominal idea has not yet been formulated or researched, but it illustrates the idea of

dealing directly with syntax instead of measuring it by the computation of average sentence length.

A review of formulas, techniques, criticisms, and issues in readability assessment highlights the following ideas:

1. Older formulas combine word difficulty and sentence difficulty scores. Thus, the separate effects of vocabulary and sentence structure are not evident from results of the formulas' computations.
2. Word frequency is an important factor in vocabulary assessment. Approaches to defining just how "frequent" a word may be vary from referring to a list of words unknown by fourth graders to noun frequency counts based upon school journals and textbooks.
3. Although syntactic considerations are limited mainly to sentence-length, there is a trend toward more direct consideration of syntax in readability.

Trends in Language Assessment

Both the newer readability formulas and the research-oriented language measurements highlight the distinction between vocabulary and syntax. Some measures, such as Hunt's T-Unit and Dawkins' proposed pre- and postnominal count, assess syntax alone, while others such as Hanf's

"Design of Discourse" attempt to deal with vocabulary and syntax on a separate-but-equal basis.

As far as readability measures are concerned, frequency is still a major consideration in assessment of vocabulary, while research-oriented measures such as Lee's (1974) Developmental Sentence Analysis consider the "semantic intent" of the language in measuring vocabulary used by children. With reference to vocabulary, Elley's (1969) noun-frequency readability assessment may represent a growing awareness that some types of words, especially nouns, carry a great deal of meaning, and thus might be a major focus of vocabulary assessment in readability.

Summary of the Search of Literature

The preceding overview of language measurements was made from the point of view of one making a search. The search was for a language measurement procedure or procedures which could be used to assess student-authored reading materials in terms of how easy or difficult those materials might be for other children to read. A summary of the findings follows:

1. Research-oriented measures such as the T-Unit are intended to measure only syntactic elements.
2. Those measures which do consider vocabulary and meaning as well as sentence structure are detailed, complicated, or relatively untried.

3. Older readability formulas present two major drawbacks: first, the word lists used to determine frequency are not based upon actual frequency counts, but on the criteria of familiarity; and second, the readability scores do not distinguish between vocabulary level and complexity of sentence structure.
4. Neither the newer readability assessment techniques nor the old formulas are intended for use in the assessment of difficulty level of student-authored reading material.

So in spite of the great variety of research-oriented language measurements and the historical respectability of readability formulas, the search of the literature revealed no language measures which possess the following characteristics:

1. The intent of the procedure is to assess stories which are dictated orally or written independently by primary grade students in terms of how easy or difficult these stories may be for other children to read.
2. Scoring and interpretation procedures are simple and take little time to apply.
3. Vocabulary and sentence structure are considered as separate elements in the evaluation process.

Those who aspire to work toward the development of such language assessment procedures might do well to heed Dawkins (1975, p. 44):

. . . we will be wise to remind ourselves of the fact that we know very little about readability. Even in our area of syntax . . . we are uncertain about many analyses, lacking in empirical data, amazed by the complexity and variety of elements, clumsy in our methods, and doubtful of our oversimple results. Moreover, when we attempt to qualify these results by considering some aspect of context, we are simply overwhelmed.

With due respect for Dawkins' warning, a problem is presented in the following section which attempts to deal further with the topic of language assessment.

CHAPTER 2

THE PROBLEM

Statement of the Problem

The problem is to develop two procedures, one which assesses the difficulty level of vocabulary and one which assesses the difficulty level of sentence structure of independently written or orally dictated stories, authored by primary grade children. These procedures would be designed to assist teachers in assessing student-authored materials in terms of how easy or difficult these materials may be for other children to read.

Significance of the Problem

In general, research on children's language has concerned itself with the acquisition and development of oral language (Athey, 1971, pp. 31-36). Research and clinical methods described in the literature review have been developed mainly for such oral language research, while the readability scales described have been designed for the evaluation of reading material, and are thus entirely print-oriented.

Reading research has also preserved the distinction between speech and print. This dichotomy led Athey (1971 pp. 6-8), in a synthesis and review of papers on language

development in reading, to conclude that "More studies are needed to children's spontaneous language and writing as these interact with their early experiences in reading."

The three studies mentioned in the literature (Strickland, 1962; O'Donnell et al., 1967; Loban, 1963) are part of the research work regarding interrelationship of children's reading with their oral and written language.

Although philosophies and practices in reading instruction vary widely, there are instructional programs which highlight the interrelationships among speaking, writing, and reading. In such programs ". . . correspondences between oral and written English are used to assist children in the development of strategies to use in reading" (Goodman, 1971, p. 32).

In classroom practice, children dictate or write stories which may be used as they are originally produced or may be edited and bound into booklets for the author as well as other children to read. Quantities of written material are produced that become a part of the classroom's reading resources for instruction and for recreational reading. This student-authored reading material is vital to the on-going, interrelated language and reading program.

Teachers who devote their energies to such a program face the problem of assessment and evaluation of the reading material produced by their student authors. This assessment is not intended for the assigning of such judgments as

"Excellent," "Satisfactory," or "Unsatisfactory," but rather to give some indication of how difficult the author's stories may be for other children in the classroom to read and comprehend; and how the author may be operating as a user of the language, its semantics and syntax.

Neither the research-oriented language measurements nor the traditional readability formulas are specifically designed or intended for such purposes, although both types of measurements may contribute useful elements and ideas. For classroom application an assessment procedure is needed which has the following attributes:

1. Validity for the assessment of student-authored materials in terms of how easy or difficult these materials may be for other children to read.
2. Clearly defined rationale for language assessment.
3. Ease of application, scoring, and interpretation.
4. Reliable scoring results.

Assumptions

The assumption upon which the problem of this study is based is that vocabulary and sentence structure are crucial elements in assessment of the reading difficulty level of student-authored materials, and should be treated separately in the development of assessment procedures.

Definitions

1. Student-authored reading material--This material may consist of stories (fact or fiction), narratives, and reports. In the production of such material the students (1) dictate orally to teachers or other classroom helpers who transcribe the students' language for them or (2) write their own materials independently or with a minimum of teacher guidance. Materials are used on story charts or are bound into booklets for use in the classroom library and in the reading and language arts instruction program.
2. Primary grade students--Children are identified as primary grade students if they are enrolled in grades ranging from kindergarten through grade three, or in any combination of such grades.

CHAPTER 3

ESTABLISHING THE VOCABULARY AND SENTENCE STRUCTURE PROCEDURES

In the statement of the problem of this study certain requirements were made of the vocabulary and sentence structure procedures. Each procedure was to be built upon a clearly defined rationale for language assessment, to produce reliable scoring results, and to possess validity for assessment of difficulty level of student-authored materials used in classroom reading programs. In addition to these qualities each procedure was to be easy for classroom teachers to apply, score, and interpret.

The review of literature presented in Chapter 1 describes a search for already-existing procedures which would fulfill these requirements. Attributes of various language measurement techniques were examined, and for the enumerated reasons of validity and practicality none was chosen as a solution to the problem. It was proposed that two measurement procedures be established, one concerned with vocabulary and the other with sentence structure.

This chapter will deal with establishment of the two procedures according to certain definite rationales and the piloting of the use of the procedures with written materials.

Establishing the Vocabulary Procedure

A procedure for assessment of vocabulary of student-authored reading materials is described in the following section. A specific requirement of the procedure was that it rank student-authored reading materials according to the level of difficulty that another child might encounter when reading the selection. In addition, the procedure was to reflect a clearly-defined rationale for language measurement and to possess the qualities of ease of application, scoring, and interpretation.

Rationale for the Establishment of the Vocabulary Procedure

The vocabulary procedure was established in accordance with two main ideas. The first was the distinction between structure words and form class words. The second was frequency of use in written language.

Form Class and Structure Words. Form class words occupy positions in word order traditionally termed nouns, verbs, adjectives, and adverbs. The rest of the words have been labeled structure words, although they are also referred to as function words.

The following list of structure words has been proposed by Charles Fries (Smith, Goodman, and Meredith, 1976, p. 180):

<u>Name of Word Group</u>	<u>Example</u>
noun markers	<u>The</u> man came. (<u>a</u> , <u>an</u> are other common noun markers. This group also includes possessives and cardinal numbers.)
verb markers	He <u>is</u> coming.
negatives	He is <u>not</u> coming.
intensifiers	He may be <u>very</u> tired.
conjunctions	The man <u>and</u> the woman are singing <u>and</u> dancing.
phrase markers	They will come <u>into</u> the house.
question markers	<u>When</u> will they come?
clause markers	They will call <u>before</u> they come.

Although structure words carry little meaning when compared to form class words, they serve as "syntactical signals that define and mark off the language structure" (Smith et al., 1976, p. 180). Many of these structure words are among the most frequently used words in written language, since they provide the structure upon which the form class words are arranged. In terms of meaning the form class words carry the greatest content load while structure words function mainly to show relationships between and among the form class words. Allen (1976, p. 220), in Language Experiences in Communication, has also discussed the purposes of various classifications of structure words in language. A summary of this discussion is reproduced in Appendix A.

Word Frequency. The contrast in frequency between form class and structure words is seen by Allen as having implications for reading. The majority of structure words

. . . are high-frequency words that can be explained in terms of function at the same time they are becoming sight-reading words. Children who learn a little of the function of high-frequency words will be able, it is hoped, to predict their presence when they are reading silently, and will read at a speed much faster than the speed of speech (Allen, 1976, pp. 220-221).

Children who have an awareness of syntactic patterns in language learn to capitalize upon these high-frequency structure words to make predictions in reading.

They anticipate the name of something when they hear or see in print words that are usually noun markers . . .; they get the feeling for and anticipate words of action in sentences that complete the typical noun-verb pattern of English sentences; they anticipate words and phrases of description which modify the meanings of base nouns and verbs; and they observe the writing of many words of structure which have little or no meaning in themselves but which permit the easy flow of speech sounds and give clues that meaning-bearing words are coming (Allen, 1976, p. 306).

Many structure words occur so frequently that they occupy prominent positions on sight vocabulary lists, and some basal texts contain a great proportion of these words in their primer level stories. Regarding relationships between structure and form class words Allen (1973, p. 1), in an introduction to the "Allen Assessment of Difficulty Scale," states that

Theoretically, after initial instruction, passages are easier to read when they contain a high proportion of these (structure) words. As a result of linguistic influence, it is now recognized that it is the relationship of these structure words to form class words in language patterns that provides the best clues to levels of difficulty.

Design of Scoring Format for the Vocabulary Procedure

A word frequency study published in 1971 by John Carroll and others was used as a resource in the design of the scoring format for the vocabulary procedures (Carroll, Davies, and Richman, 1971).

In Carroll et al.'s study, samples were examined from published materials used by children in Grades Three through Nine. More than five million words were ranked by computer technology and the final published study presents frequency-of-use rankings from 1 through 86,740.

In designing the scoring process for the vocabulary procedure a word list was compiled from Carroll et al.'s Word Frequency Book. On this list words were ranked according to their frequency of use from 1 through 500. Scoring weights for these words were assigned as follows:

<u>Frequency-of-use Rank</u>	<u>Scoring Weight</u>
1 through 100	1
101 through 200	2
201 through 300	3
301 through 400	4
401 through 500	5
words ranking 501 and above	6

Within this format the more commonly used words, many of them structure words, were given the lower scoring weights, while the less commonly used words, many of them content-bearing form class words, were given greater weight in the scoring process. Therefore, a student-authored reading selection with many uncommonly-used nouns, verbs, adjectives, and adverbs would earn a higher score than a reading selection with more commonly-used vocabulary and less descriptive language.

The score yielded by application of the procedure to a representative, continuous, fifty-word sample is used to rank student-authored materials according to their potential difficulty for other students to read. It is hypothesized that children reading from a collection of student-authored materials will experience more difficulty in reading the higher-ranked stories because of their heavier load of less-commonly used form class words.

In computing the vocabulary procedure ranking, each and every word in the continuous fifty-word sample is scored. The scorer refers to the alphabetical word list on which every word ranking in frequency from first through five hundredth is included. The frequency rank of each word is tallied on the scoring sheet, and tallies for each rank are multiplied by the scoring weights to arrive at a total weighted score. Total weighted score is divided by number of words in the sample to arrive at a final score. The name

Word Procedure was chosen because of the ranking of each and every word in the scoring process. The entire vocabulary procedure, including introduction, directions, scoring sheet, and word list, is included in Appendix B.

Two story samples are scored and reproduced in Figure 1 as illustrations of the application of the procedure to student-authored materials.

Piloting the Use of the Vocabulary Procedure with Reading Materials

The Word Procedure was subjected to pilot testing. During this phase it was applied to children's stories and to published materials, and some changes and amendments were made in the format. The following section describes the initial testing and amending of the procedure.

Application to Student-Authored Materials

In its original form the procedure had a "Word Box" on the scoring page. A number of structure words were listed in the box, with the instructions that these words were to be excluded from ranking and scoring. This was done in order to place greater emphasis upon form class words and to exclude the most frequently-used words in scoring the selections.

As children's stories were analyzed and scored the "Word Box" idea began to present problems. Some of the excluded structure words such as although, while, between,

A SNOWY DAY

It was winter. It was snowing.
 I went out to play. There was
 snow on the sidewalks. I like snow,
 do you? It was cold outside.

INFORMATION AND DATA SHEET Date _____

Title of selection _____ Examiner _____

Author _____ Age _____ Grade _____ School _____

Approximate reading level (if known) _____ Title and publisher of reading material used or by the child (author) _____

Indicate with an x:

written independently X

written with assistance _____

dictated to examiner _____

dictated to other than examiner _____

prose _____ poetry _____

patterned language _____

Computation:

$$\frac{\text{Total weighted score} = 60}{\text{No. of words in sample} = 26} = 2.3$$

divide by

Ranks	Frequency	Weighted Score	
1 (1-100)	III III III II	17	Notes: Please note any special motivational techniques, environmental conditions or relevant information about the child who authored the story.
2 (101-200)	I	2	
3 (201-300)	I	3	
4 (301-400)	I	4	
5 (401-500)	II	10	
6 (others)	IIII	24	
Total weighted score:		60	

Figure 1. Sample Stories and Vocabulary Procedure Scoring

ALONG THE WAY

When the sun had finally come up I had already seen a beautiful cloud. It looked like a lizard that was trying to eat a striped butterfly with roses along the center of its wings. After a while the lizard was gone, and the butterfly looked quite happy.

INFORMATION AND DATA SHEET

Date _____

Title of selection _____ Examiner _____

Author _____ Age _____ Grade _____ School _____

Approximate reading level (if known) _____ Title and publisher of reading material used or by the child (author) _____

Indicate with an x:

written independently _____

written with assistance _____

dictated to examiner X _____

dictated to other than examiner _____

prose _____ poetry _____

patterned language _____

Computation:

$$\frac{\text{Total weighted score}}{\text{No. of words in sample}} = \frac{134}{48} = 2.8$$

Divide by

Ranks	Frequency	Weighted Score
1 (1-100)		24
2 (101-200)		10
3 (201-300)		6
4 (301-400)		8
5 (401-500)		20
6 (others)		66
Total weighted score:		134

Notes: Please note any special motivational techniques, environmental conditions or relevant information about the child who authored the story.

Figure 1.--Continued

and such, for example, are rarely used in primary children's writing, and when their stories did include these words it seemed important to gain information about the effect of these structure words upon the readability of the selection. During this preliminary trying-out period more and more classes of structure words were deleted from the "Word Box" until only determiners and some conjunctions remained.

After further application to children's stories it was finally decided to do away with the "Word Box" entirely, since the structure words which remained in it were all on the first 100 list of word frequency, and added only one point each to the scoring results.

Application to Certain Published Materials

In addition to pilot testing with student-authored materials the Word Procedure was also applied to various textbooks. A sampling of the results is included in Appendix C.

The amended form of the Word Procedure did rank reading texts in a manner fairly consistent with the publishers' rankings, especially when continuous fifty-word samples were chosen from the end of the books. This trend was also observable in an assessment of a Social Science series. In all cases, however, a ceiling seemed to be reached at a point somewhere around 3.5, regardless of the assigned reading level of the text. This effect was also

observed in application of the procedure to children's stories. Few of the stories sampled produced Word Procedure scores higher than 3.5.

This leveling-off may be caused by the scoring format, which gives only a weight of six to any words occurring less frequently than the first 500 most frequently used words. The word lizard has a ranking of 6400 in the Carroll et al. (1971) study, which could give it a weight of 65. It is given only a weight of 6 in the present scoring format. In the interests of scoring ease, however, it was decided to retain the first 500 word limitation, since the word list was already three pages long and lengthening it would add to the difficulty of the scoring process.

Establishing the Sentence Structure Procedure

The search of literature documented in Chapter 2 revealed that measurements of sentence structure in regard to readability had been confined mainly to the criterion of average sentence length, with the resulting statistic included in a final score which combined vocabulary and sentence structure values. To adequately reflect the sentence structure of student-authored reading materials it was proposed that an assessment of sentence structure for readability be established to treat sentence structure as separate from vocabulary and to give an indication of the

complexities of sentences in the selection, thus refining the average sentence length measure. In addition, the assessment procedure was to be easy for classroom teachers to apply, score, and interpret.

Rationale for the Establishment of the Sentence Structure Procedure

One of the influences upon the development of the sentence structure procedure was the distinction between deep structure and surface structure highlighted in transformational grammar. In the two sentences below, the deep structure is the same, but two different surface structures are evident.

Fido bit Judy.

Judy was bitten by Fido.

It has been suggested that the processes whereby words are arranged, rearranged, added, substituted, and deleted to produce the various surface structures of written language may either simplify or complicate the task of a reader (Dawkins, 1975, pp 36-37).

The psycholinguistic view of reading proposed by Goodman (Smith et al., 1976, pp. 265-283) also influenced the development of the sentence structure procedure. According to this view, the reader simultaneously uses multiple clues from syntactic, semantic, and grapho-phonetic systems in order to predict what is going to happen next.

When these predictions are not confirmed the reader must recycle, correct, and then proceed.

The element of predictability in written materials has been highlighted by Allen in his emphasis upon patterned language for beginning reading instruction (Allen, 1976, pp. 143-146). When syntactic patterns are repeated in reading material the reader is afforded more prediction power.

The sentence structure procedure, as it was ultimately established, was based upon a synthesis of these ideas:

1. The syntactic system has an influence upon the predictions made by a reader in the process of reading.
2. Through various syntactic processes the main elements of a sentence are embedded within surface structures which may make prediction more difficult for some readers.

Therefore the task was defined to design a procedure whereby the degree of embedding of the main elements within the sentence could be measured.

Dawkins (1975) in Syntax and Readability hypothesizes that readability may be affected by prenominals, words preceding the subject of the sentence, and post-nominals, words occurring between subject and its verb and between the verb and the end of the sentence. He also

suggests that postnominals occurring between subject and verb could potentially cause more difficulty than prenominals. The following sentence provides examples of prenominals and postnominals:

prenominals
 {
 All of the tired and hungry children,
 postnominals between subject and verb
 {
 their lunches stolen by the dogs,
 other postnominals
 {
trudged home from the park.

The prenominal-postnominal idea seemed to be a promising framework for quantifying sentence structure because it provided a means by which scoring weights could be assigned to words preceding the subject, postponing the reader's identification of what the sentence was about, and words intervening between subject and verb, delaying the reader's resolution of the sentence. This procedure would also give evidence of the degree of embedding of the main sentence elements within the surface structure of the sentence.

Design of Scoring Format for Sentence Structure Procedure

A scoring procedure was designed whereby prenominals and postnominals in a story selection were to be counted and

scored to quantify the potential readability of sentences written by student authors. Prenominals were given a weight of two, postnominals intervening between subject and verb were given a weight of four, and all other words were multiplied by a factor of one. The total weighted score was divided by number of sentences being analyzed. The final score was then applied to an interval scale to obtain a ranking of sentence structure difficulty for the selection. A representative sample of five consecutive sentences was recommended in the scoring directions. The name Two-Four Procedure was suggested by the scoring weights accorded the pre- and postnominals. The Two-Four Procedure, including introduction, scoring sheet, and directions, is included in Appendix D.

To illustrate the application of the procedure two story samples are scored with the sentence structure procedure and shown in Figure 2.

Piloting the Use of the Sentence Structure Procedure with Reading Materials

The Two-Four Procedure was subjected to pilot testing. During this phase it was applied to children's stories and to published materials, and some amendments were made to the scoring format and directions.

When the procedure was applied to written materials several complications occurred because many of the sentences in children's stories and reading texts presented special

A SNOWY DAY

It was winter. It was snowing.
 I went out to play. There was
 snow on the sidewalks. I like snow,
 do you? It was cold outside.

Indicate with an X:
 written independently X
 written with assistance _____
 dictated to examiner _____
 dictated to other _____
 than examiner _____
 prose X poetry _____
 patterned language _____

Notes: Please note any special motivational techniques, environmental conditions, or relevant information about the child who authored the selection.

Step 1. Classify and Count (If you wish to score more than five sentences, divide columns down the center.)

Sentence No.	1	2	3	4	5,6	Totals	Weighted Score
Prenominals	0	0	0	2	0:0	2	x 2 = 4
Postnominals	0	0	0	0	0:0	0	x 4 = 0
All other words	3	3	5	4	5:4	24	x 1 = 24
							Total, 28

Step 2. Compute the Two-Four Score (Round to nearest whole number.)

(divide) $\frac{\text{Total weighted score}}{\text{No. of sentences in selection}} = \frac{28}{6} = 4.7$ (Two-Four Score)

Step 3. Compare Two-Four Score with Interval Scale. Circle ranking of sentence structure difficulty for the selection.

<u>Interval Scale</u>	
<u>Two-Four Score Intervals</u>	<u>Rankings of Sentence Structure Difficulty</u>
0 - 5.9	(1) (Basic Level)
6 - 10.9	2
11 - 15.9	3
16 - 20.9	4
21 - 25.9	5 (Challenge Level)
26 and above	Above Challenge Level

Figure 2. Sample Stories and Sentence Structure Scoring

ALONG THE WAY

When the sun had finally come up I had already seen a beautiful cloud. It looked like a lizard that was trying to eat a striped butterfly with roses along the center of its wings. After a while the lizard was gone, and the butterfly looked quite happy.

Indicate with an X:

written independently _____
 written with assistance _____
 dictated to examiner _____
 dictated to other than examiner X
 prose X poetry _____
 patterned language _____

Notes: Please note any special motivational techniques, environmental conditions, or relevant information about the child who authored the selection.

Step 1. Classify and Count (If you wish to score more than five sentences, divide columns down the center.)

Sentence No.	1	2	3	4	5	Totals	Weighted Score
Prenominals	7	0	6			13	x 2 = 26
Postnominals	2	0	1			3	x 4 = 12
All other words	5	21	6			32	x 1 = 32
							Total: 70

Step 2. Compute the Two-Four Score (Round to nearest whole number.)

(divide) $\frac{\text{Total weighted score}}{\text{No. of sentences in selection}} = \frac{70}{4} = 17.5$ (Two-Four Score)

Step 3. Compare Two-Four Score with Interval Scale. Circle ranking of sentence structure difficulty for the selection.

<u>Two-Four Score Intervals</u>	<u>Rankings of Sentence Structure Difficulty</u>
0 - 5.9	1 (Basic Level)
6 - 10.9	2
11 - 15.9	3
<u>16 - 20.9</u>	<u>4</u>
21 - 25.9	5 (Challenge Level)
26 and above	Above Challenge Level

Figure 2.--Continued

scoring problems. Passives, commands, compound elements, and dialogue-and-narrative combinations did not lend themselves to simple pre- and postnominal analysis. Therefore two pages of "solutions" to these special problems were written. These pages are included in Appendix D. An example of one of these special problems and the suggested scoring procedure is reproduced below.

7. Dialogue and narrative combinations.

Count all words in the sentence as if they were prenominals. Weighting each word by the factor of 2 gives credit for the complexity of mixed dialogue and narrative structures.

Example: Carla said, "here is a good picnic spot."

The procedure was also applied to several textbook series. A sampling of the results is included in Appendix C. In general, the Two-Four scores did rank the texts in a manner fairly consistent with publishers' rankings.

Comparisons Between Word Procedure and Two-Four Procedure Rankings

Twelve selections of student-authored materials were ranked with both the Word Procedure and the Two-Four Procedure, in order to assess the degree of correlation between rankings produced by the two procedures. These rankings are compared in Table 3.

Table 3. Word Procedure and Two-Four Procedure Rankings of Student-Authored Stories

Reading Selection	Word Procedure		Two-Four Procedure	
	Score	(Rank)	Score	(Rank)
A	1.3	(1)	10.0	(4)
B	1.8	(2)	4.8	(1)
C	2.1	(3)	15.9	(9)
D	2.2	(4)	4.8	(1)
E	2.3	(5)	12.3	(6)
F	2.3	(5)	26.2	(11)
G	2.4	(6)	10.9	(5)
H	2.4	(6)	7.2	(3)
I	2.5	(7)	20.2	(10)
J	2.5	(7)	6.5	(2)
K	2.5	(7)	14.4	(8)
L	2.8	(8)	13.1	(7)

There was minimal correlation between rankings produced by the two procedures. Some reading selection contained simple vocabulary and complex sentence structures, while others had relatively difficult vocabulary and simple sentence structures. These results lend support to the proposal that sentence structure and vocabulary be considered separately in assessing a reading selection in terms of potential difficulty for a reader.

The development and pilot testing of the Word Procedure and the Two-Four Procedure has been described in preceding sections. Following this preliminary testing phase both procedures were subjected to evaluation of reliability, validity, and practicality. These evaluation processes are described in the following chapter.

CHAPTER 4

EVALUATION OF WORD PROCEDURE AND TWO-FOUR PROCEDURE

The Word Procedure and the Two-Four Procedure were each evaluated for reliability, validity, and practicality. Evaluation processes were designed to investigate these questions:

1. Did the Word Procedure rank standardized reading test selections according to reading difficulty level of vocabulary?
2. Did the Two-Four Procedure rank standardized reading test selections according to reading difficulty level of sentence structure?
3. Did each procedure produce reliable results? Were results similar when many rankings were made of the same passages?
4. Was each procedure practical in terms of ease of scoring and interpretation?

In the following evaluation processes each step involved in evaluating validity, reliability, and practicality for the Word Procedure was also followed for the Two-Four Procedure.

Evaluation of Validity with Standardized Reading Materials

In order to test validity against an external standard, members of a group of twenty raters were each given the same six reading passages from the Gilmore Oral Reading Test (Gilmore, 1952). The passages represented six different levels of reading difficulty as defined by test publishers. Raters ranked the passages using the Word Procedure, and vocabulary rankings were compared with publisher's rankings in order to determine the degree of correlation between the two. This same process was followed with the Two-Four Procedure. Specifically, these steps were followed for each procedure:

1. A group of twenty raters was chosen randomly from among students enrolled in teacher education classes in the College of Education, The University of Arizona, during Spring semester, 1976.
2. Each member of the group was given the same six passages from the Gilmore Oral Reading Test. Passages ranged from Level I through Level VI, according to publisher's ranking. Raters were not shown publisher's rankings, nor were they presented the passages in any specific order.
3. Each rater assessed the reading difficulty level of vocabulary of all six passages, using the Word Procedure.

4. Each rater assessed reading difficulty level of sentence structure of all six passages, according to the Two-Four Procedure.

Vocabulary and sentence structure rankings were tabulated separately for each of the six passages, and the following statistical analyses were made:

1. A mean rank was computed for each passage. These mean ranks were plotted on a chart against publisher's rankings of passage difficulty. Thus a picture was drawn of correlation between rankings obtained from application of the procedures and rankings assigned by the publisher.
2. Pearson product-moment correlation was used to determine degree of relationship between procedure rankings and publisher's rankings for each of the six passages.

Through these processes and statistical analyses both the Word Procedure and Two-Four Procedure were evaluated by comparison with the external standard of the Gilmore Oral Reading Test. Raters' rankings of difficulty level of the passages are presented in Appendix E.

Data Obtained from Evaluation of Validity
with Standardized Reading Materials

Mean ranks were computed from students' rankings of the six levels of reading passages with the Word Procedure

and the Two-Four Procedure. Figure 3 shows these mean ranks compared with publisher's ranking of difficulty level of test passages. Mean ranks are shown for both the Word Procedure and the Two-Four Procedure.

Degree of relationship between procedures' rankings and publisher's rankings of difficulty level was determined by Pearson product-moment correlation. The following correlation ratios were obtained:

Word Procedure: $r = .88$

Two-Four Procedure: $r = .90$

Both values of r were found to be statistically significant by comparison to a table value at an .05 alpha level. These results indicate that there was a significant degree of correlation between publisher's ranking of reading difficulty and rankings provided by application of the Word Procedure and Two-Four Procedure.

Evaluation of Reliability with Standardized Reading Materials

Reliability of both the Word Procedure and the Two-Four Procedure was assessed through application of the procedures to various levels of reading passages. In the validity testing process described above the raters applied both procedures to six different levels of passages from the Gilmore Oral Reading Test (Gilmore, 1952) to determine if the procedures ranked passages accurately in terms of

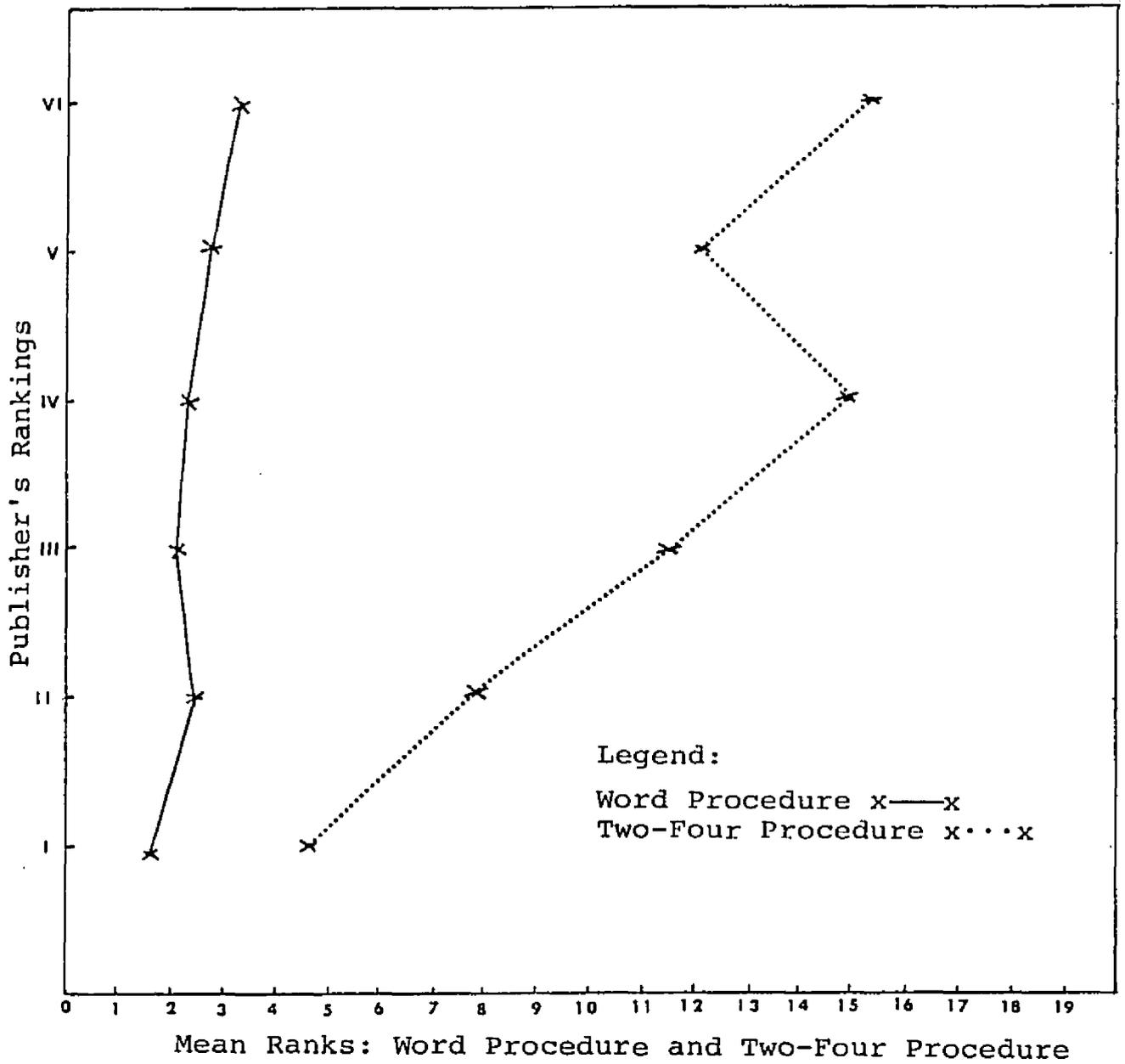


Figure 3. Correlation Between Procedure Rankings and Publisher's Ranking of Difficulty Level of Reading Test Passages

difficulty. Data collected in that validation process were also subjected to statistical tests of reliability.

Reliability Testing of the Word Procedure

Data were collected from raters' assessments of the six passages, and results were analyzed to determine how closely the raters agreed with each other in terms of their rankings of vocabulary difficulty of those passages.

In order to assess reliability of the Word Procedure the correlation ratio

$$(\text{ETA})^2 = \text{SS}_{\text{group}} / \text{SS}_{\text{total}}$$

was computed. This correlation ratio measures a range from zero to 1, and indicates the degree of agreement among members of the group in terms of their rankings of the six passages. For a value of 1 to be obtained there must be complete agreement within each of the six passage rankings as well as differentiation between passage rankings in terms of levels.

Reliability Testing of the Two-Four Procedure

In one of the steps outlined in the validity testing process raters assessed the same six reading passages using the Two-Four Procedure. Evaluation of reliability of this sentence structure procedure involved the same processes as described for the Word Procedure.

Data Obtained from Evaluation of Reliability
with Standardized Reading Materials

In order to assess the degree of agreement among raters in terms of their rankings of the six reading test passages, the correlation ratio (ETA)² was computed for Word Procedure rankings and Two-Four Procedure rankings. The following correlation ratios were obtained:

Word Procedure: ETA = .787

Two-Four Procedure: ETA = .685

Both ratios were subjected to an F test for significance at the .05 alpha level. For the Word Procedure the F statistic of 4.63 exceeded the table value of 2.96. This indicated that there was a significant degree of agreement among raters in terms of their rankings of test passages with the Word Procedure. For the Two-Four Procedure the F statistic of 2.47 was less than the table value of 2.96, indicating that degree of agreement among raters was not statistically significant.

Evaluation of Practicality

Practicality of both the Word Procedure and the Two-Four Procedure was determined by asking a sample of raters to evaluate ease of scoring and interpretation processes involved in using the procedures. Raters included ten student teachers, ten teachers, and ten classroom helpers such as aides and parent volunteers.

For each procedure ease of scoring and ease of interpretation were separately assessed with a five-point scale on which the extremes ranged from "difficult to score" to "easy to score," and "difficult to interpret" to "easy to interpret." A tabulation of raters' evaluations is presented in Appendix E.

Data Obtained from Evaluation of Practicality

Mean ratings from evaluation of practicality for the Word Procedure and the Two-Four Procedure are presented in Tables 4 and 5.

For all three groups the Word Procedure appeared to be easier to score and to interpret than the Two-Four Procedure. Raters' comments indicated that they appreciated the simple scoring format of the Word Procedure, while they felt that the Two-Four Procedure required too much expertise in grammatical analysis.

Summary of Evaluation of Reliability, Validity, and Practicality of Word Procedure and Two-Four Procedure

The Word Procedure and the Two-Four Procedure were established, pretested, and subjected to evaluation of reliability, practicality, and validity. Validity testing was limited to application to a graded-level oral reading test, to determine if the procedures ranked the reading

Table 4. Ease of Scoring: Mean Ratings by Three Groups of Raters

Groups	Word Procedure	Two-Four Procedure
Students (N = 10)	2.5	3.5
Teachers (N = 10)	1.5	3.0
Aides (N = 10)	2.0	3.5

Table 5. Ease of Interpretation: Mean Ratings by Three Groups of Raters

Groups	Word Procedure	Two-Four Procedure
Students (N = 10)	2.5	4.0
Teachers (N = 10)	2.0	3.5
Aides (N = 10)	2.5	4.0

test passages according to level of difficulty designated by test publishers.

Word Procedure and Two-Four Procedure rankings both correlated significantly with publisher's ranking of difficulty level of reading test passages, indicating validity as measured by comparison with standardized reading materials. In terms of reliability, however, Word Procedure rankings indicated a significant degree of agreement among raters of the six test passages, while the Two-Four Procedure did not produce statistically significant agreement. The Two-Four Procedure was also given lower practicality ratings than the Word Procedure by the three groups of raters.

In summary, statistical analyses of the data indicated that (1) both the Word Procedure and the Two-Four Procedure ranked standardized reading test selections in a manner similar to publisher's rankings of difficulty level, (2) Word Procedure rankings were more reliable than Two-Four Procedure rankings when twenty rankings were made of the same six reading test passages, and (3) the Word Procedure was judged by raters to be more practical than the Two-Four Procedure in terms of ease of scoring and interpretation.

Decisions Based Upon Evaluation
of Both Procedures

In the evaluation of validity according to standardized reading materials the Word Procedure and the Two-Four Procedure both produced rankings which correlated significantly with publisher's rankings of difficulty level of reading test passages. Word Procedure rankings, however, were significantly more reliable than Two-Four Procedure rankings, and, in addition, the Word Procedure was judged by raters as being the more practical of the two procedures to apply.

Pilot testing and evaluation of the Two-Four Procedure indicated that, in its present form, it lacked sufficient reliability and practicality to justify further testing. Therefore it was decided to set aside the Two-Four Procedure and to subject just the Word Procedure to an additional evaluation of validity for ranking student-authored materials according to their potential difficulty for a reader. The following chapter describes this evaluation of the classroom application of the Word Procedure.

CHAPTER 5

EVALUATION OF THE WORD PROCEDURE FOR CLASSROOM USE

Testing and assessment of the Two-Four Procedure and the Word Procedure indicated that the Word Procedure showed the greater promise in terms of reliability and practicality. The question of validity for classroom use remained to be resolved.

The criterion for classroom validity was that the procedure rank student-authored reading materials according to their potential difficulty for other children to read. In view of the greater practicality and reliability of the Word Procedure it was decided to subject this procedure to additional evaluation according to the criterion for classroom validity.

Therefore, four student-authored stories of different Word Procedure rankings and lengths were chosen, and twenty second-graders read all four stories. Their understanding of what they read was assessed by asking them to retell each story, and their retellings were taped and scored according to the process described in the Reading Miscue Inventory (Goodman and Burke, 1972, pp. 19-26, 68-69). This process was selected over a predetermined question-answer format because the open-ended retelling activity

affords readers the greater opportunity to manifest their comprehension of reading selections. Retelling scores for each story were compared to determine if there were differences between stories in terms of children's comprehension.

The following sections describe evaluation of the use of the Word Procedure for ranking student-authored materials according to their difficulty for another child to read.

Choosing the Stories

Because the Word Procedure was designed specifically for application to student-authored reading materials, one hundred or more stories, narratives, and reports were obtained from elementary school students and from collections of children's writing in Grades 1 through 5, and ranked for difficulty level using the Word Procedure. These materials were either independently written or dictated. Some of them had been edited by the author and some were in their original form. From this collection four stories were chosen for children to read and retell.

It was originally planned to use three stories, one ranked by the procedure as among the lowest in terms of difficulty, one ranked among the highest, and one ranked approximately midway between the two extremes. In examining children's stories, however, it became apparent that

lower-ranked stories tended to be considerably shorter than higher-ranked stories. Because it was not possible to closely control story length, four stories were chosen with the lengths and Word Procedure rankings shown in Table 6.

Table 6. Word Procedure Ranking and Story Length of Sample Stories

Story No.	Word Procedure Ranking	Length in Words
1	1.8	71
2	2.3	72
3	2.3	213
4	2.8	246

Stories 1 and 2, which were .5 points apart on the Word Procedure rankings, were approximately the same length. Stories 3 and 4, which were .5 points apart on Word Procedure rankings, were also about the same length. Stories 2 and 3, ranked similarly with the Word Procedure, were of different lengths. Stories 3 and 4 were approximately 3 times as long as stories 1 and 2. These variations in Word Procedure rankings and lengths increased the

possibilities for comparisons among the results of the retelling scoring.

The four stories were all independently written fictional story material. Following the process described in the Reading Miscue Inventory, a retelling outline was prepared for each story, listing characters, events, and ideas inherent in the story. The retelling outline gave a framework for quantifying stories that was not provided by the criterion of length alone, since numbers of characters and events were enumerated in the outline. It also provided the basis for scoring the children's retelling of each story that they read.

The four stories, with their retelling outlines, are reproduced in Figure 4.

Children Reading Stories Written by Other Children

In a classroom where student-authored materials are used as reading resource materials, children's stories are often bound into booklets and placed in the classroom library for other children to choose for independent reading. Children usually read these stories of their choice silently. Therefore, in evaluation of classroom use of the Word Procedure, the children were asked to read silently before they did their retelling.

During individual interview sessions twenty second graders were asked to read each of the four stories silently

Story 1: SHIPWRECKED

I was going on a trip to sea. And I was with Kent, Stephen, and me. There was a storm coming. We were all sleeping. It was bad. We had to be waked up by Kent, and we were on the boat on the island. The boat was not OK. So we got all the things we needed and made a new home. And we all lived there for days.

Figure 4. Sample Stories and Outlines for Quantifying Retellings

Name _____	
<u>Story 1, Retelling Outline: SHIPWRECKED</u>	
(Word Score 1.8)	
<u>Character--Recall</u> (30)	
The author	(10)
Kent	(10)
Stephen	(10)
<u>Events</u> (56)	
(7) The author goes to sea with two friends, Kent and Stephen.	
(7) A bad storm comes up.	
(7) The boys are asleep in their boat.	
(7) Kent wakes everyone up, and they find themselves on an island.	
(7) The boat is no longer good enough to go back to sea in.	
(7) The boys take supplies from the boat.	
(7) They build a home on the island.	
(7) They live there for many days.	
<u>Other Ideas</u> (14)	
(7) The author is telling the story.	
(7) Sometimes things don't always go as planned (theme).	
<u>Misconceptions</u>	

Figure 4.--Continued Stories and Retelling Outlines

Story 2: THE MACHINE THAT WOULDN'T STOP

One day there was a machine that made money. When the money store was closed for the night someone forgot to turn the machine off so in the morning the store was flooded with money. When Mr. Moon the owner came he didn't notice that the store was flooded but when he opened the door he saw that money was flying all over the place. Mr. Moon ran all over town.

Figure 4.--Continued Stories and Retelling Outlines

Name _____	
<u>Story 2, Retelling Outline:</u> THE MACHINE THAT WOULDN'T STOP (Word Score 2.3)	
Character-- (20)	
Recall	Development
(5) Mr. Moon	(5) owned the money story
(5) unnamed person	(5) the "someone" who forgot to turn off the money machine
<u>Events</u> (60)	
(10) One night, when closing the money store, someone forgot to turn off the money machine.	
(10) The machine made money all night.	
(10) In the morning the store was flooded with money.	
(10) Money was flying around in the store.	
(10) Mr. Moon was surprised when he opened the door.	
(10) He was so excited that he ran all over town.	
<u>Other Ideas</u> (20)	
(10) Mr. Moon had a problem that other people might like to have--too much money.	
(10) When people don't do their jobs, a machine can cause problems (theme).	
<u>Misconceptions</u>	

Figure 4.--Continued Stories and Retelling Outlines

Story 3: THE DANGEROUS BOX

Once upon a time there was a little boy. His name was Fred. He always went out for the mail. One day he went out for the mail. He saw a big box that said Danger Keep Out. So today Fred did not take the mail in for his mother. He just went in the house and told his mother to take the mail in. So his mother went outside and she saw the signs on the box. Before you could say "Puff" she was screaming, "aaaaaaaaaaaaa!" "There's some explosives in that box."

So she waited until her husband came home. Before you could say "Puff" he said "aaaaaaaaaaaaa!" too. So when he finished screaming he went over to it very, very slowly. There was some explosives in the box. He turned the box around and finally he found a name on the box. It was his old friend Mike Smith. He lived in Spain. So Fred and his mother and father took the 7:30 plane in the morning. They were in Spain in no time. The minute they got off the plane they saw father's old friend Mike Smith. Then father ran off the plane and caught Mike Smith and brought him to jail. Everybody lived happily ever after. Except Mike Smith.

Name _____
<u>Story 3, Retelling Outline: THE DANGEROUS BOX</u> (Word Score 2.3)
<u>Character--Recall</u> (20)
(5) Fred
(5) Mother
(5) Father
(5) Mike Smith
<u>Events</u> (66)
(6) A mysterious box comes to Fred's house in the mail.
(6) The box is labeled <u>Danger Keep Out</u> .
(6) Fred always gets the mail, but he decides not to bring it in because of the dangerous box.
(6) Fred's mother goes to get the mail herself, at Fred's request.
(6) She screams when she realizes that the box contains explosives.
(6) When Fred's father comes home he also screams, but then he inspects the box and discovers a name on it.
(6) The name is Mike Smith. He is an old friend who lives in Spain.
(6) The next morning Fred, his father, and his mother take the 7:30 plane to Spain.
(6) When they get off the plane they see Mike Smith.
(6) Fred's father catches Mike Smith and puts him in jail.
(6) Everyone is happy except Mike Smith.
<u>Other Ideas</u> (14)
(7) An old friend changes to a deadly enemy. (Plot)

Figure 4.--Continued Stories and Retelling Outlines

(7) Be careful of strange gifts. You might get an unpleasant surprise if you aren't careful. (Theme)

Misconceptions

Figure 4.--Continued Stories and Retelling Outlines

Story 4: THE MACHINE THAT WOULDN'T STOP

One day in Robotville there was a scientist who built and maintained all the machines. On Oct. 5, 1992, he was trying to invent a machine that would turn off automatically. Perfected! Or so he thought. At first the machine worked fine. So the scientist thought he would take a vacation.

The machine got a rest period every 5 hours. The new machine (computer XL51) followed all the rules until one five hour period he didn't and wouldn't stop. He just went faster and faster and faster. All the town's people were doing their best to stop him. The scientist must be found!

At the Lake

At the lake the scientist was enjoying himself very much. He was getting all rested up. The next few days he started feeling guilty about leaving all his work for fishing. He decided to go back.

The Journey Back

Halfway back he met Hugo, a boy from the town.

"You must hurry back," cried Hugo.

"Why" What is the matter? "Slow down and tell me!" exclaimed the scientist.

"It all started with that machine of yours. "It won't stop!" cried Hugo.

"Nothing to worry about," said the scientist calmly.

"Nothing to worry about! "Why the whole town is practically smothering in paper the machine keeps pushing!" exclaimed Hugo.

They had now reached the town.

"Follow me," said the scientist.

Hugo and other people followed him. The scientist went over to the machine and pulled the plug.

"And that's that," said the scientist with a smirk on his face.

Figure 4.--Continued Stories and Retelling Outlines

Name _____
<p>Story 4, Retelling Outline: <u>THE MACHINE THAT WOULDN'T STOP</u> (Word Score 2.8)</p>
<p><u>Character--Recall</u> (20)</p> <p>(10) Scientist</p> <p>(10) Hugo</p>
<p><u>Events</u> (60)</p> <p>(6) A scientist lives in Robotville, where he builds and maintains all the machines.</p> <p>(6) The story takes place in the future--October 5, 1992.</p> <p>(6) The scientist invents a machine that is supposed to turn off automatically every five hours.</p> <p>(6) He believes it to be perfected, and goes off on a fishing trip.</p> <p>(6) After a while the machine won't stop, and goes faster and faster.</p> <p>(6) The town's inhabitants are upset and don't know what to do.</p> <p>(6) Meanwhile the scientist, who had been relaxing at the lake, begins to feel guilty and decides to go back to the town.</p> <p>(6) A little boy named Hugo meets the scientist halfway.</p> <p>(6) Hugo is excited and begs the scientist to hurry back because the town is smothering in paper from the machine.</p> <p>(6) The scientist remains calm. He goes to the machine and pulls its plug.</p>
<p><u>Other Ideas</u> (20)</p> <p>(10) This story hasn't happened yet, so it couldn't be true.</p> <p>(10) People may be so afraid of machines that they don't know how to control them. (Theme)</p>
<p><u>Misconceptions</u></p>

Figure 4.--Continued Stories and Retelling Outlines

and to retell as much as they could about each story as they finished reading it. Their retellings were taped for later transcription and scoring. A sample retelling script and scoring sheet are shown on pages 69 and 70. As suggested in the Reading Miscue Inventory (Goodman and Burke, 1972) retellings were uninterrupted until children completed their spontaneous statements. Then the interviewer asked only questions which did not volunteer specific information, such as "Can you think of anything else that happened?" "Why do you think (an event already described) happened?" "What was (a character already named) like?"

After the children read and retold all four stories they were asked to put the stories in order from easiest to hardest. A tally was made of their rankings.

Children Retelling Stories Written by Other Children

Each retelling was transcribed and scored according to the procedure described in the Reading Miscue Inventory. In this process the child's retelling is compared to the retelling outline, to see how many characters, events, and ideas the child gleaned from reading the selection. Points are assigned on the retelling outline for each character, event, and idea, with one hundred points possible for each story. The rater underlines on the retelling outline the story elements mentioned by the child in the retelling.

Credit is allowed for children's use of their own relevant vocabulary even though it is not identical to that used in the story. In this particular evaluation process each retelling was scored by two raters working independently. Disagreement between raters never exceeded four points. Where disagreements occurred, the higher score was used. A sample retelling is reproduced in Figure 5, with the retelling outline and scoring results.

As retellings were transcribed and scored, records were kept of children's misconceptions about characters and events in the four stories. Therefore, in evaluating the Word Procedure for classroom use three types of data were collected: retelling scores, student ranking of story difficulty, and misconceptions related by readers in the course of their retellings.

Report of Data Obtained from Children's Retellings

The children's retelling scores for each story are shown in Figures 6 through 9. Retelling scores recorded on these graphs will be discussed in the following sections, and comparisons among stories will be made on the basis of Word Procedure rank, length of selection, and mean retelling scores.

Table 7 presents a comparison of Word Procedure rankings and story lengths with the means of retelling scores for each story.

Sample Retelling and Scoring--Story 1

Guy--Reading Level, 1²; Age, 7-1/2; Grade 2
(I--Interviewer; S--Student)

I: Tell me all about this story, Guy.

S: Well, they went out to sea and they were making a house and they were sleeping and there . . . it was bad so they lived in their home and it was bad and they . . .

I: What happened as they went to sea?

S: They made a home and when went in it when it was bad.

I: Who was in the story?

S: Kent, Stephen, and me.

I: Did they do anything else?

S: It was raining and windy and st . . .

I: Do you think they expected that?

S: No, cause they wanted to have fun and play and to fish and stuff. Then it was windy and rainy, so they probably went home.

I: Where do you think they made this home?

S: In the little desert place where nothing is--a little round place.

I: Was there anything on this little round place?

S: Banana trees, animals, cactus . . . there would be fish on the beach, sharks, whales, dolphins, there was some bees, people . . .

I: Anything else.

S: That's all.

Figure 5. Sample Retelling and Scoring, and Retelling Outline

Name Guy

Story 1, Retelling Outline: SHIPWRECKED
(Word Score 1.8)

Character--Recall (30)

10 The author (10)

10 Kent (10)

10 Stephen (10)

Events (56)

7 (7) The author goes to sea with two friends, Kent and Stephen.

7 (7) A bad storm comes up.

3 (7) The boys are asleep in their boat.

4 (7) Kent wakes everyone up, and they find themselves on an island.

(7) The boat is no longer good enough to go back to sea in.

(7) The boys take supplies from the boat.

7 (7) They build a home on the island.

(7) They live there for many days.

Other Ideas (14)

(7) The author is telling the story.

(7) Sometimes things don't always go as planned. (Theme)

Misconceptions

Score: $\begin{array}{r} 30 \\ 28 \\ \hline 58 \end{array}$

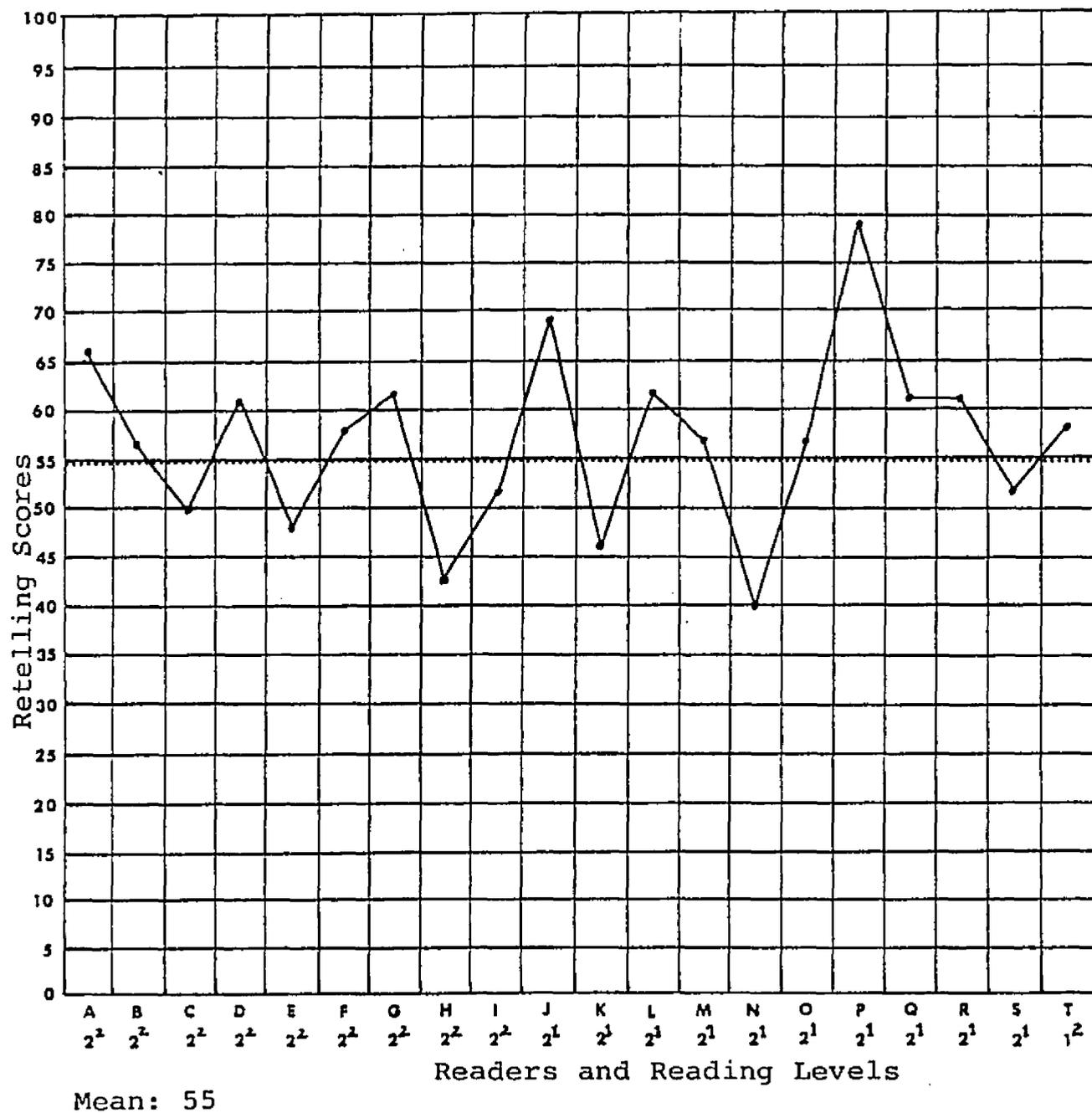


Figure 6. Retelling Scores--Story 1

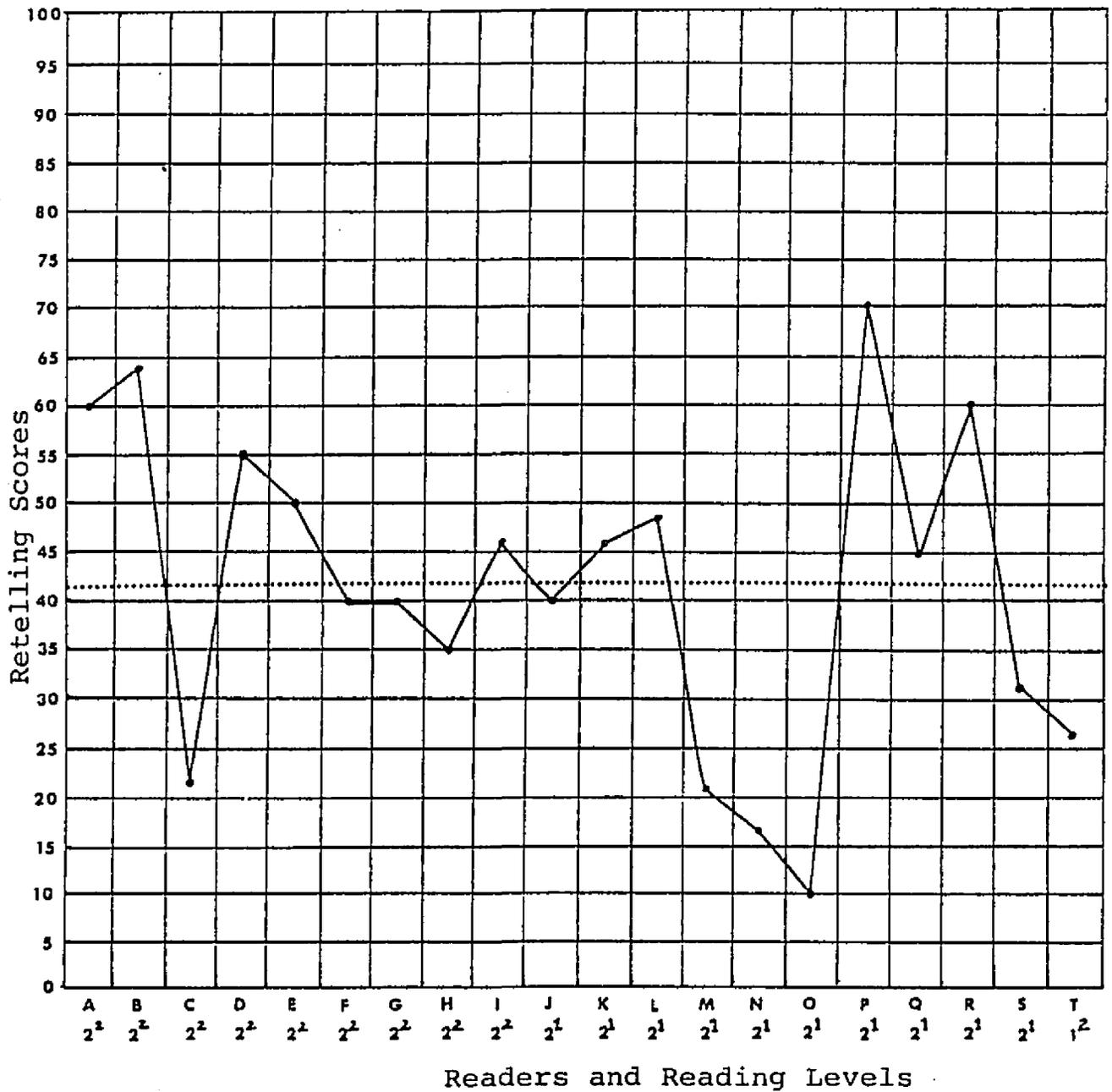
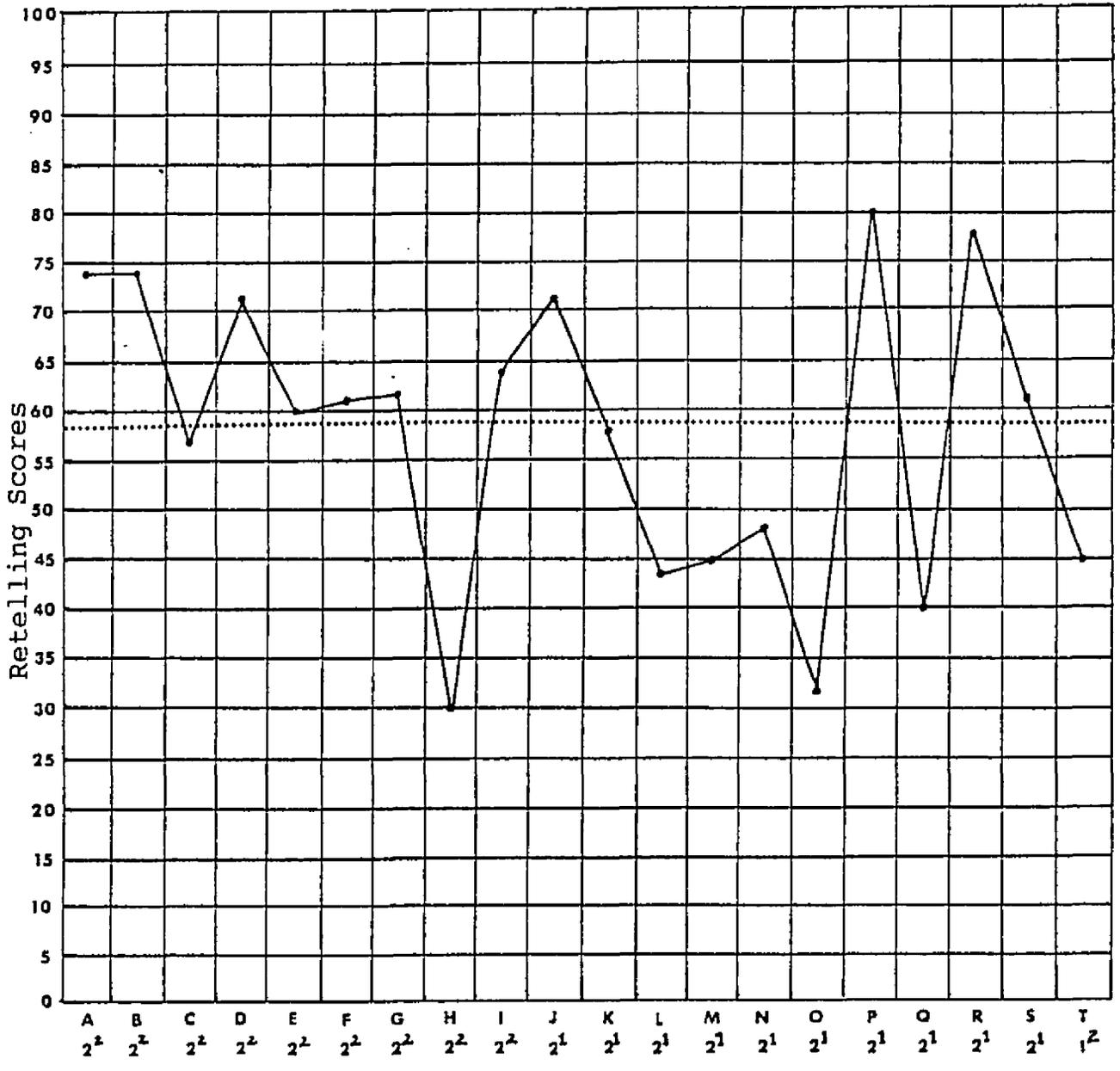


Figure 7. Retelling Scores--Story 2



Mean: 57.75

Readers and Reading Levels

Figure 8. Retelling Scores--Story 3

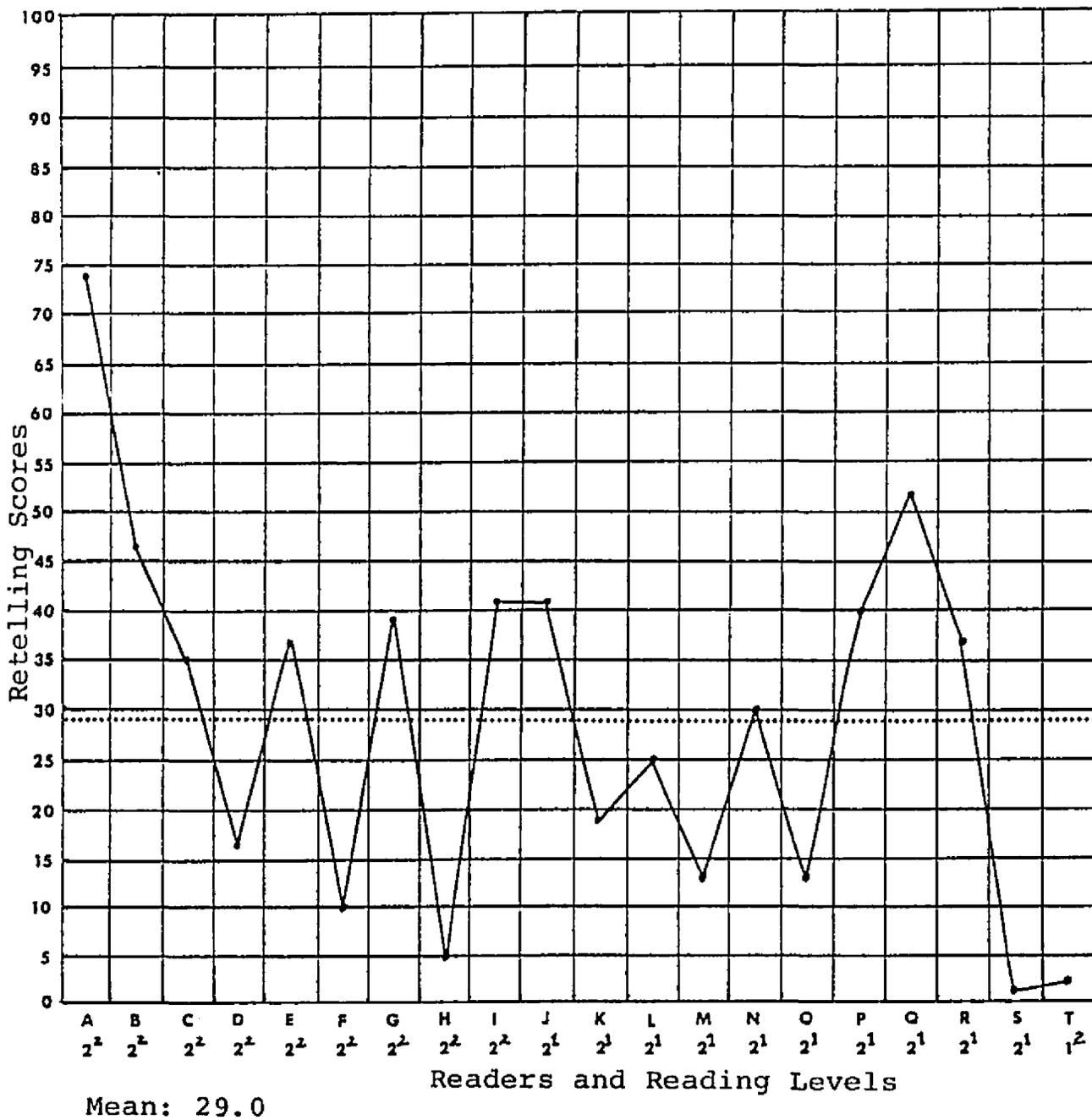


Figure 9. Retelling Scores--Story 4

Table 7. A Comparison Among Four Stories According to Word Procedure Rankings, Story Length, and Mean Retelling Scores

Story Number	Word Procedure Rank	Length of Selection in Words	Mean Retelling Score
1	1.8	71	55.0
2	2.3	72	41.4
3	2.3	213	57.8
4	2.8	246	29.0

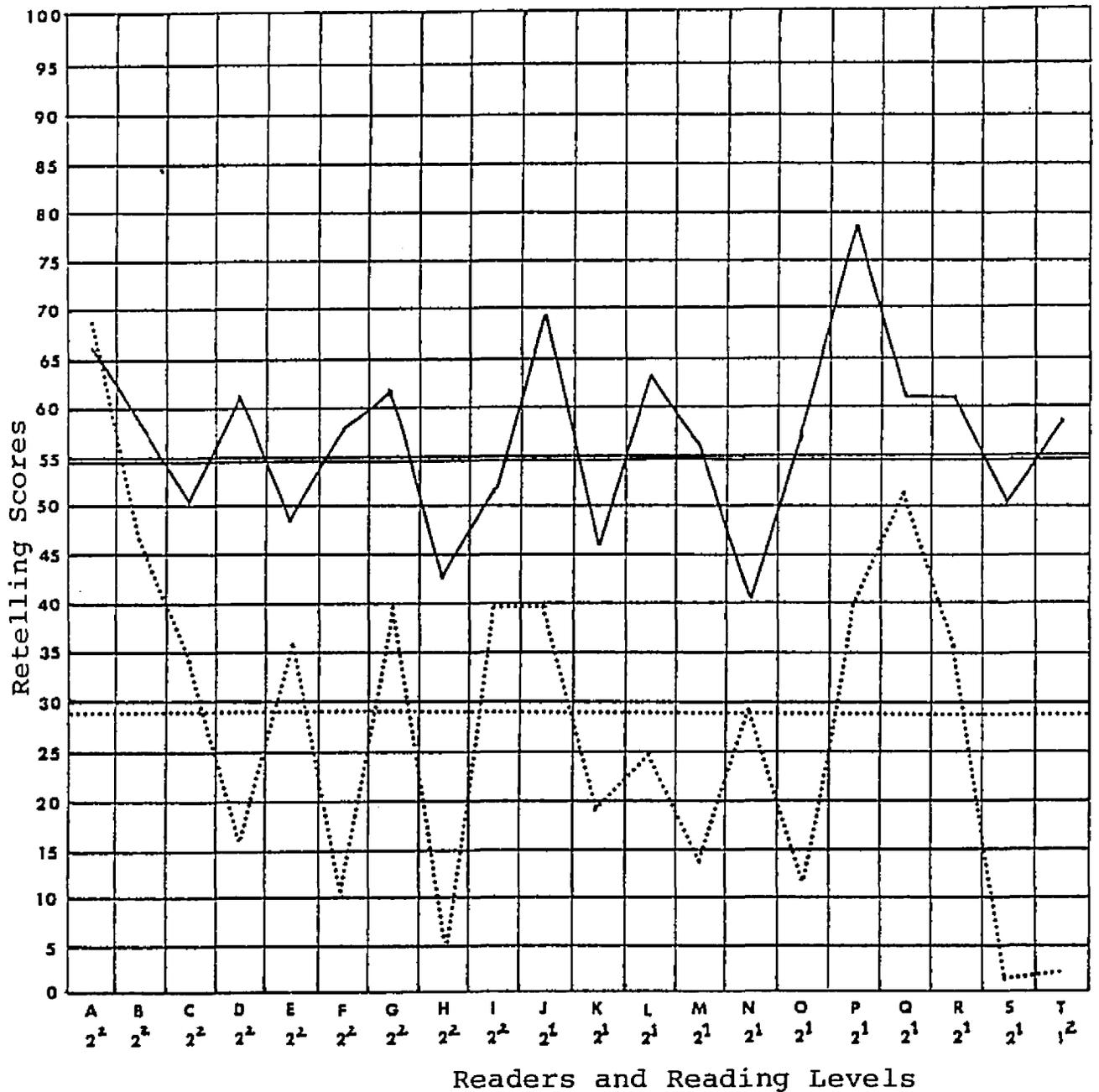
Comparisons Between Stories with Different Word Procedure Rankings

When retelling scores for Story 1 (judged easiest to read by the Word Procedure) are compared with retelling scores for Story 4 (judged hardest to read by the Word Procedure) there is statistically significant difference between mean retelling scores. The mean for Story 1 was 55.0 while the mean for Story 4 was 29.0.

In order to determine statistically significant difference between the two means a t statistics was computed, and an alpha level of .05 was applied to determine significance of the obtained t value. This same procedure was followed for each comparison between mean retelling scores discussed in the following sections.

As judged by mean retelling scores, Story 1 was apparently easier for children to comprehend than was Story 4. Figure 10 presents a comparison of retelling scores for these two stories. Although the Word Procedure did predict that children would experience more difficulty reading Story 4 than Story 1, there is a length variable that must be acknowledged. Story 4 was three times as long as Story 1.

Therefore, the next comparison will be between two stories that differ in Word Procedure difficulty rankings but are the same length. Story 1 (Word Procedure ranking 1.8) and Story 2 (Word Procedure ranking 2.3) are both



Legend:
 Story 1: Mean 54.95 —
 Story 4: Mean 29.0 ...

Figure 10 Comparison of Retelling Scores for Story 1 and Story 4

similar in length, with 71 and 72 words, respectively. Retelling scores obtained from these two stories are compared in Figure 11.

Story 1, with a mean retelling score of 55.0, had a statistically significant higher mean retelling score than Story 2, with a mean retelling score of 41.4. Therefore it appears that on these two stories of equal length the Word Procedure did predict the relative difficulty that children encountered in their efforts to understand what they read.

When the two longer stories are compared the pattern is similar. Story 3 (Word Procedure ranking 2.3) and Story 4 (Word Procedure ranking 2.8) are the two longest stories. Story 3 has 213 words and Story 4 has 246 words. Figure 12. presents a comparison of retelling scores for these two stories.

The mean retelling score for all readers on Story 3 was 57.8 while the mean for Story 4 was 29.0. Here again, for stories of equal length, the Word Procedure did predict relative difficulty of the story selections.

Comparisons Between Stories with Similar Word Procedure Rankings

The preceding comparisons have dealt with stories that were dissimilar in terms of their Word Procedure rankings. There were, however, two stories included in the study which had the same Word Procedure rankings but different lengths. Story 2 and Story 3 both had Word Procedure

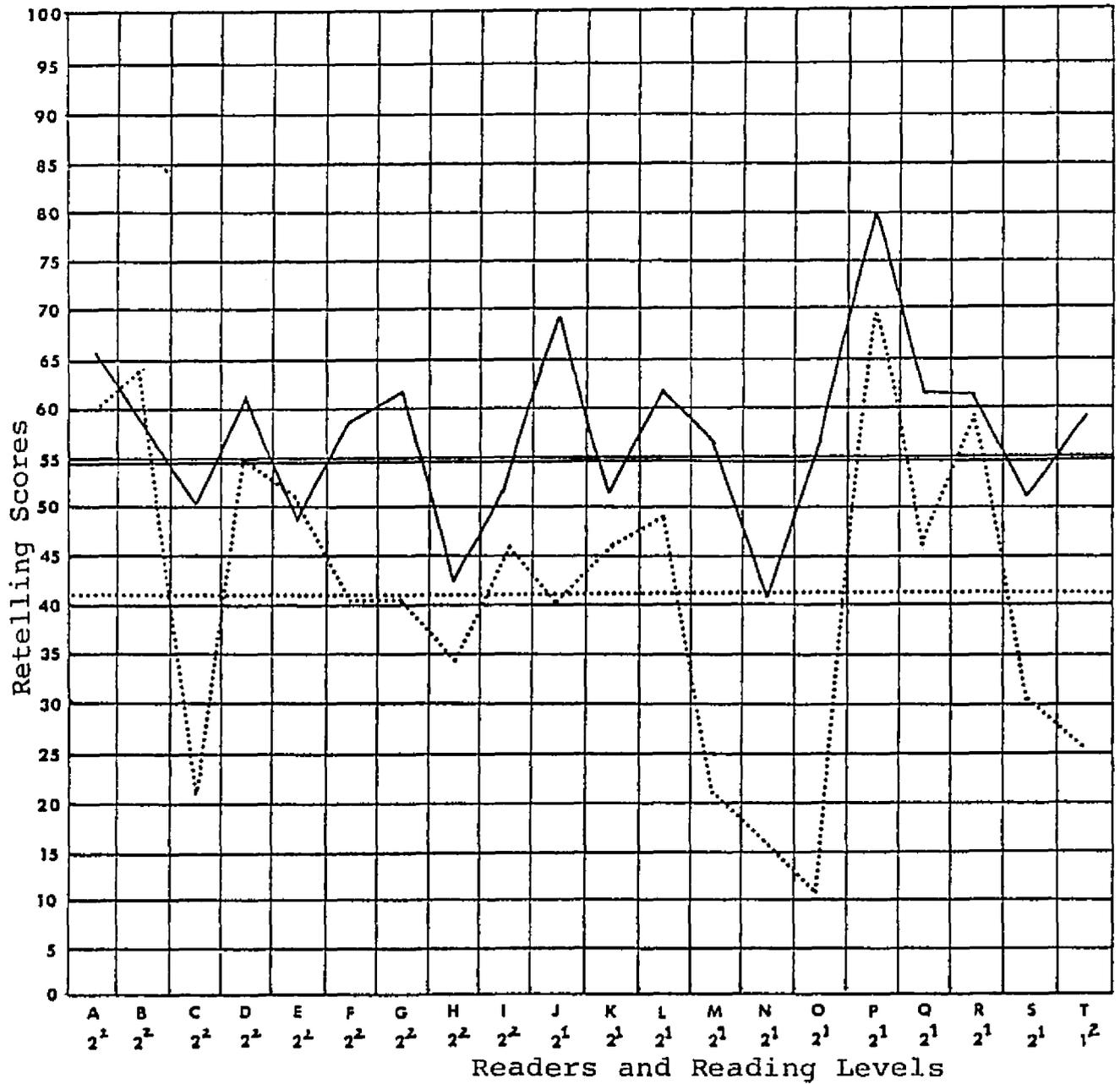


Figure 11. Comparison of Retelling Scores for Story 1 and Story 2

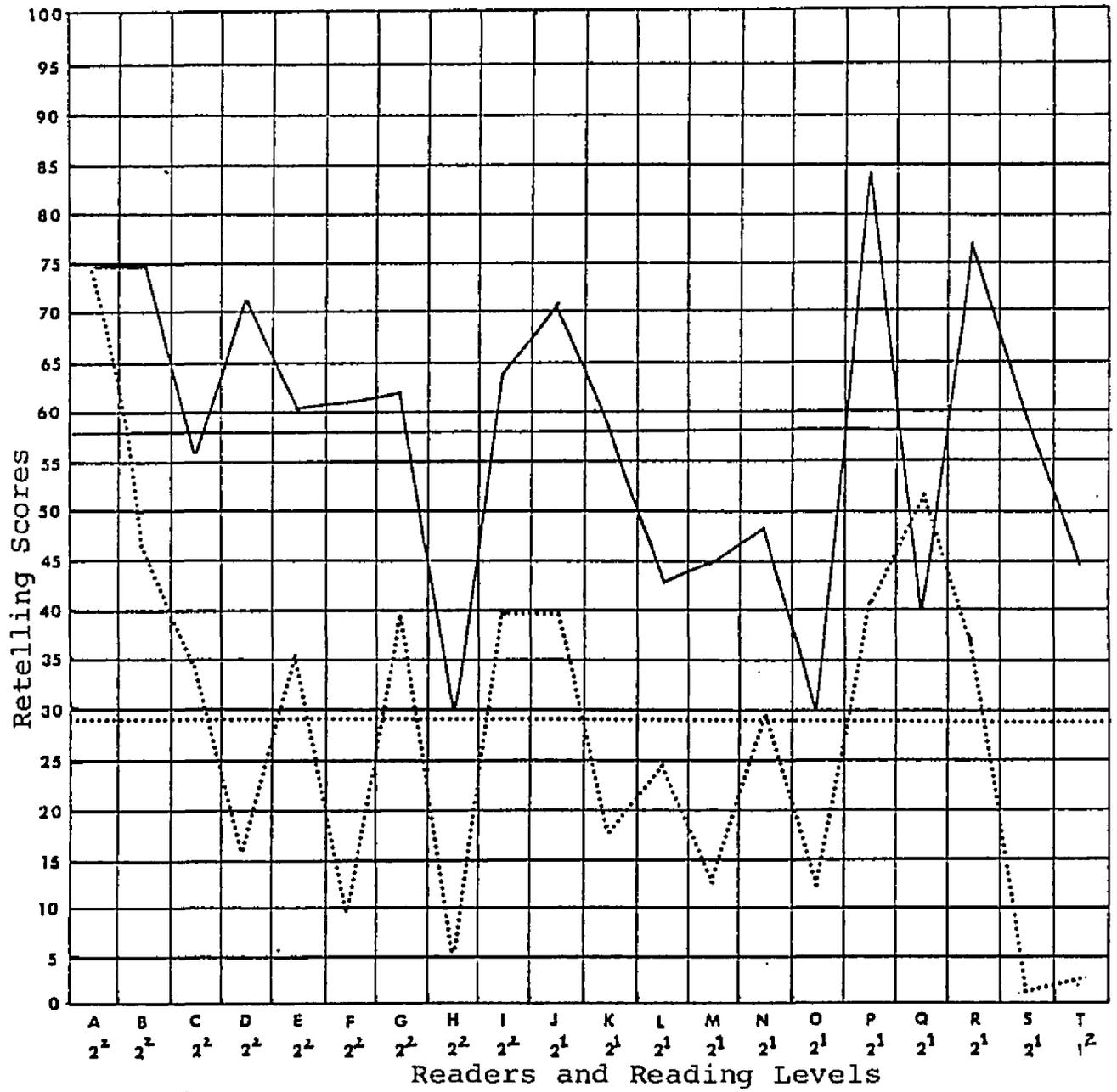
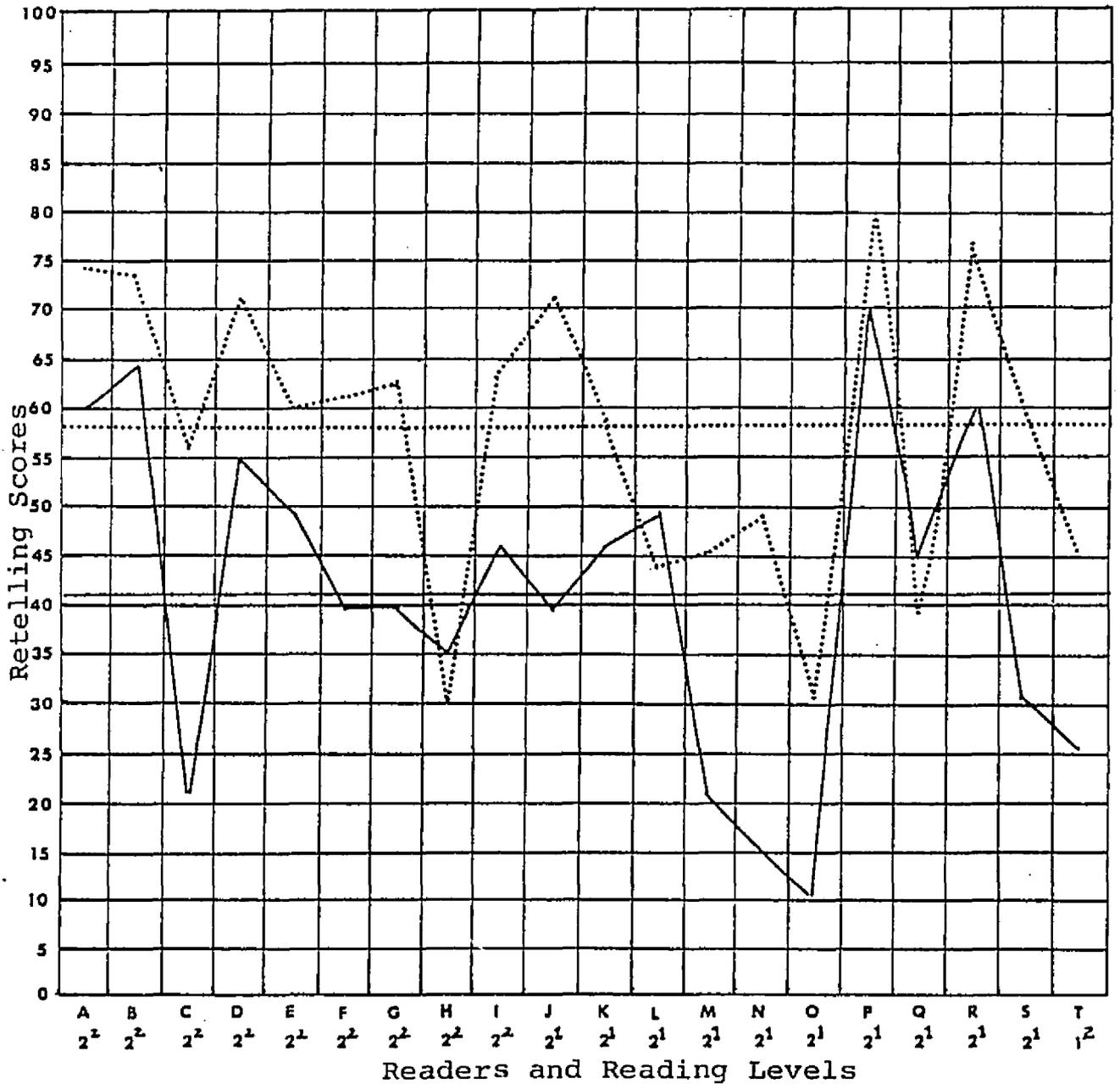


Figure 12 Comparison of Retelling Scores for Story 3 and Story 4

rankings of 2.3, but Story 2 had 72 words while Story 3 was considerably longer, with 213 words. These two stories represented the mid-point in Word Procedure rankings, half-way between Story 1 and Story 4. Figure 13 presents a comparison of retelling scores obtained for Stories 2 and 3.

The two stories, ranked equally difficult but of different lengths, evoked significantly different mean retelling scores. As in the case of all other comparisons between means, significance of difference between means was determined by a t test at the .05 alpha level. Readers were much more successful with the longer Story 3 (mean retelling score of 57.8) than with the shorter Story 2 (mean retelling score of 41.4). In fact, although the differences were not statistically significant, the retelling mean for Story 3 was higher than that for Story 1, which was the shortest and easiest of the four stories in terms of potential reading difficulty. Therefore, when children's retellings of two stories of similar Word Procedure ranking but different lengths were compared their retellings of the longer story were more comprehensive and detailed, resulting in higher retelling scores.

Preceding sections have dealt with evaluation of the Word Procedure in terms of mean retelling scores produced when twenty second-graders read four student-authored stories of various Word Procedure rankings.



Legend:
Story 2: Mean 41.40 —
Story 3: Mean 57.75 ...

Figure 13. Comparison of Retelling Scores for Story 2 and Story 3

There is another element in the study, and that is the element of the individual reader. Although mean retelling scores for the group did provide information for evaluating the Word Procedure, each individual child's retelling results were also analyzed to uncover any additional information about the validity of the Word Procedure for ranking difficulty of student-authored materials.

The Individual Readers

The twenty second-graders were a heterogeneous group of readers. Reading records revealed that nine of the children were reading at a level commensurate with the beginning of the second semester of the second grade. In the discussion which follows this group will be referred to as the 2/2 group. Ten of the children were shown by the records to be reading at a beginning second grade level (called the 2/1 group), and one child had a first grade, second semester classification (the 1/2 reader). These levels were determined by the teacher through a combination of achievement test results, informal reading inventories, and teacher observation and evaluation.

All the 2/1 children were reading in a basal text designated second grade, first semester; the 2/2 children were reading in a text designated second grade, second semester; and the 1/2 reader was using a basal text

designated first grade, second semester. These basal texts were mandated for use by the school district.

When reading stories written by other children, however, these readers did not show differences in comprehension, as measured by retelling scores, that would be expected from their designated reading levels. The ranges of retelling scores earned by each reading group for their readings of Stories 1, 2, 3, and 4 are shown in Table 8.

For Story 1, the simplest and shortest story, retelling scores did not correlate with reading levels assigned these children in their classroom instruction program. In fact, one of the 2/1 readers earned the highest retelling score of all on Story 1, 79 points out of a possible 100, and the child with a first grade reading level designation earned 58 retelling points on Story 1, which was the exact mean for all Story 1 retellings. For Stories 2 and 3 also, some of the highest retelling scores were produced by the 2/1 readers.

To narrow the focus upon the reader still further, individual reader profiles were drawn, showing each child's performance on the four reading tasks. Each profile yielded a range from highest retelling score to lowest retelling score earned by the child. When the data for each profile were examined, the results supported the analysis described above. A sample from the collection of individual reader profiles is presented in Appendix E.

Table 8. Range of Retelling Scores According to Reading Levels

Reading Level	Story 1 Retelling Scores			Story 2 Retelling Scores			Story 3 Retelling Scores			Story 4 Retelling Scores		
	High	Low	Range									
1/2	58	58	--	27	27	--	45	45	--	3	3	--
2/1	79	40	39	70	10	60	80	32	48	52	2	50
2/2	69	43	26	64	22	42	74	30	44	74	5	69

Readers' Misconceptions

As retellings were scored, records were kept of apparent misconceptions held by the readers. These misconceptions were recorded on the individual profile sheets and analyzed for hints as to their causes. Table 9 shows the number of misconceptions generated by each story, according to designated reading level of the individual readers.

Story 1, the sample story which was written in the first person, generated eight misconceptions. Eight out of twenty readers showed confusion during their retelling regarding "what's-his-name" or "some other kid."

Studies by Carol Chomsky have also indicated that pronouns such as the "I," "me," and "we" used in Story 1 may confuse children who are at certain stages of language development (Chomsky, 1969, p. 126). Interestingly, this first-person confusion did not cause retelling scores to suffer, since Story 1 generated the highest retelling scores of all four stories.

Story 2, which was as short as Story 1 but written in the third person, generated only two misconceptions, while Stories 3 and 4, written in the third person and three times as long as Story 1, each generated nine misconceptions. No specific causal patterns could be identified for these stories' misconceptions.

Table 9. Misconceptions in Readers' Retellings of Sample Stories

Sample Story Number	Misconceptions by 2/2 Readers (9 readers)	Misconceptions by 2/1 Readers (10 readers)	Misconceptions by 1/2 Reader (1 reader)
1 (71 words)	4	4	--
2 (72 words)	--	3	1
3 (215 words)	4	4	1
4 (246 words)	2	6	1

Readers' Rankings of Stories According to Difficulty

After reading the four stories the second-graders were asked to put the stories in order from easiest to hardest. Tallies of their rankings are presented in Table 10.

Table 10. Tallies of Rankings of Story Difficulty

	Ranking Patterns				
	1,2,3,4	1,3,2,4	2,1,3,4	1,2,4,3	3,1,2,4
Number of Readers	10	5	2	2	1

In their rankings of the four stories the readers generally agreed that Story 1 was the easiest and Story 4 the hardest, with Stories 2 and 3 occupying varying positions in the middle. Fifteen of twenty children ranked the stories in this manner. Thus, most of the readers' rankings of story difficulty matched Word Procedure rankings.

As discussed previously, retelling scores indicated that readers actually understood Story 3 the best, followed by Stories 1, 2, and 4. Only one ranked the stories 3, 1, 2, and 4. His reasoning was that Story 3 was a "better

story, because there was more to it," though he did say that Story 1 had the "easiest words."

Five children judged Story 3 to be easier than Story 2. These children ranked the stories 1, 3, 2, and 4.

Summary of Evaluation of Word Procedure for Classroom Use

In summary, evaluation of the Word Procedure indicated that its rankings predicted the difficulty level of student-authored reading materials when these materials were of approximately equal length. Mean retelling scores were significantly different when stories of equal length but of different Word Procedure rankings were compared. However, when stories ranked equivalent by the Word Procedure but of different lengths were compared retelling scores for the longer story were much higher than retelling scores for the shorter story. Therefore, length is a factor which must be taken into account when ranking stories for reading difficulty level with the Word Procedure.

An analysis of misconceptions related by readers in the course of their retellings indicated that for each story there was little relationship between Word Procedure ranking and misconceptions. Story 1, ranked easiest to read by the Word Procedure and containing only 71 words, accounted for almost as many misconceptions as Story 4, ranked most difficult by the Word Procedure and containing 246 words. However, Story 1 was the only selection of the

four written in the first person, and the eight misconceptions recorded for this story were all related to children's confusion about who was telling the story.

The readers involved in this study, regardless of assigned reading level, performed equally well for each story in terms of their retelling scores. Children who were designated as below grade level performed on a par with their peers when reading stories written by other children.

When the children were asked to rank the four stories from easiest to hardest, many of them ranked the stories in the same manner as the Word Procedure, with Story 1 judged the easiest, Story 4 judged the hardest, and Stories 2 and 3 placed in the middle.

Implications of these findings and extensions of ideas generated in evaluating the Word Procedure for classroom use are discussed in the following chapter.

CHAPTER 6

IMPLICATIONS AND EXTENSIONS

Preceding chapters gave an account of the design and evaluation of language measurement procedures for ranking the reading difficulty level of material written by children for other children to read. In the process of design and evaluation a great deal of respect was gained for complexities of language and for competencies children display in their production and interpretation of written language.

Children Reading Stories Written by Other
Children: Implications Drawn from
Evaluation of Word Procedure
for Classroom Use

In order to evaluate the Word Procedure for classroom use, it was necessary to duplicate as closely as possible the classroom situation wherein one child reads story material written by another. In the analysis of primary grade students' comprehension of stories written by other children, some issues were raised which have implications for the use not only of student-authored reading materials but also of professionally-prepared reading materials. These implications are discussed in the following sections.

Story Length

Reading has been described by Kenneth Goodman as a search for meaning, in which the reader uses multiple cues in order to predict, confirm, and comprehend (Smith et al., 1976, pp. 267-283). In this study the search-for-meaning idea was supported by retelling scores which indicated that children understood the longer story "Dangerous Box" much better than the shorter story "Machine That Wouldn't Stop" even though both stories had been equally ranked for vocabulary difficulty by the Word Procedure. As one of the readers said, "The one about the box had more to it," while the story about the machine "wasn't finished off very good."

There is an indication that longer story material may be easier for readers to comprehend because the longer material provides more cues with which they may predict, confirm, and comprehend. As Walter Kintsch (1974, p. 11) has suggested, fully complete texts, although they contain ambiguities and contradictions, may be easier to comprehend than abbreviated texts.

Misconceptions

The personal, I-centered, first-person nature of many stories written by children may be a factor in misconceptions related by children in the course of their retellings. When young children write personal experience stories, they may assume that everyone knows all about them

and their daily affairs. Therefore they may omit information that a reader needs in order fully to comprehend the text.

Misconceptions generated by readers of the first-person story "Shipwrecked" were all related to misidentification of the author as "what's-his-name" or "some other kid." However, an analysis of retelling scripts indicated that misconceptions held by these Second Grade readers did not detract a great deal from their retelling scores. Even the few bizarre misconceptions generated by Story 4 (a tale of a scientist who invents a machine that goes berserk and floods a town with paper) seemed to have logical elements that in some cases actually added interest to the basic content of the story. An illustration of this effect is presented below:

Student: The people in the town were mad because they didn't want the scientist to pull the plug on the machine.

Interviewer: Why do you think they didn't want him to do that?

Student: Probably because the liquid would go all over when he pulled it. Like wine or whiskey would run all out of the hole and somebody might set it on fire.

The misconceptions generated by interaction of readers with certain kinds of reading materials provide a promising area for further research. This research might deal with the conceptual inputs a reader brings to the

reading act and with the varieties of concepts inherent in reading materials.

Self-Selection of Reading Materials

Other implications for the use of student-authored reading materials involve children's self-selection of reading materials and their success in reading. In evaluating the Word Procedure for classroom use a tabulation was kept of student ranking of story difficulty, and comparisons were made of retelling results for children with various assigned reading levels in their classroom reading program.

Children in the lower reading groups performed as well as their peers in their comprehension of the four student-authored stories. In addition, all children, regardless of their reading level, showed that they had definite criteria for judging the ease or difficulty of a reading selection. A girl in the 2/1 reading group stated, "It doesn't matter how long a story is if you can read most of the words." Regarding what makes a word hard, a boy in the 2/2 reading group said, "Some little words are harder than some big words. It all depends on if your teacher has taught them to you or not."

In classrooms where student authorship is an integral part of the program, children's stories are often bound and placed in a classroom library for children to

choose for recreational reading. Results of the Word Procedure evaluation indicate that children in such a classroom could enjoy a great deal of success in selecting and understanding stories written by their classmates.

Focusing Upon Student-Authored Materials:
Limitations and Extensions of
the Word Procedure

Results of evaluation of the Word Procedure for classroom use indicated that the procedure could prove useful to classroom teachers in predicting how easy or difficult certain student-authored materials might be for other children to read. In the course of the evaluation, however, some limitations as well as some extensions were discovered. These limitations and extensions are discussed in the following sections.

Limitations

The Word Procedure was designed as a method of assessing the vocabulary of student-authored materials to determine how difficult those materials might be for other children to read. Two major problems discovered in evaluating the use of the procedure were the leveling-off of scores near the 3.5 level and the variable story length. Because of the ceiling effect, it is suggested that the Word Procedure be applied mainly to stories written and read by children in primary grades. Also, as discussed in previous sections, Word Procedure rankings predict reading

difficulty level more accurately when stories of equal length are compared.

Extensions

There are extensions of the use of the procedure which may prove more useful than the original purpose of ranking student-authored materials according to potential difficulty for a reader. One such extension may be the use of the Word Procedure as a measure of changes and developments in one child's writing over a period of time.

Another extension of the Word Procedure may be its use in making comparisons among a collection of shared-experience stories. In classrooms where student authorship is an integral part of the reading and language arts instructional program, children's stories are often written about shared experiences such as a class study trip or other event in which all children participate. In the process, a body of shared experiences and vocabulary is generated which should contribute to readability of stories shared among the group. Since the Word Procedure, with its heavy scoring weight upon the less frequently used form class words, assigns higher ranking to stories that contain vivid vocabulary, this procedure could provide a means for comparing a collection of such experience-generated stories. It could also prove useful to teachers who are selecting and

preparing shared-experience reading materials for use in their reading programs.

A promising extension of the Word Procedure may be its use in teacher education. In the classroom, students and teachers deal continually with language every day. Therefore, teachers must be literate about language, its patterns, and processes. The Word Procedure, with its linguistic-based rationale and emphasis upon word frequency, could prove useful in highlighting relationships between the high-frequency structure words and the content-bearing form class words in student-authored or commercially-written reading materials. When teachers become sensitive to the ways in which student authors arrange structure and form class words into meaningful phrases and sentences, they may become more skillful in relating reading instruction to the natural language competencies of children.

According to Allen (1976, p. 232) teachers who are knowledgeable about language will, among other things, know which words are of higher frequency, which of the high-frequency words are structure words, and which form class words occur most frequently. They will not be dependent upon published materials alone but will also be able to use student-authored materials to teach the necessary sight vocabulary of high-frequency words and to equip children with the skills they need in order to deal with the various categories of form class words.

The Word Procedure may be a useful tool for raising teachers' levels of sensitivity to the linguistic environment.

Issues and Questions for Further
Investigation

The language measurement procedures designed and tested in this study were originally intended as tools for assessing and ranking student-authored materials. As the study progressed and problems were encountered, it became evident that one way to learn respect for the complexity of language was to try to measure and quantify it. In evaluating procedures for assessment of vocabulary and sentence structure, many issues and questions were raised regarding the interaction of readers with student-authored reading materials. Some of these questions are enumerated below.

1. What is the effect of story length upon a reader's comprehension?
2. What causes misconceptions and what effect do misconceptions have upon a reader's understanding of a student-authored or professionally-written story?
3. What strategies and criteria do children use in selecting their own reading materials? In what ways might their choices reflect their concepts of themselves as readers?
4. What developments and changes take place over time in children's writing when their stories are

published for other children to read as part of the classroom reading and language arts instructional program?

The Word Procedure may be useful in researching some of the very questions that were raised in the course of its design and evaluation.

Although we share a common language, each individual possesses a natural, unique style of oral and written expression. Perhaps the best use of the Word Procedure is that it provides a means for appreciating a child's way with words.

When the sun had finally come up I had already seen a beautiful cloud. It looked like a lizard that was trying to eat a striped butterfly with roses along the center of its wings. After a while the lizard was gone, and the butterfly looked quite happy.

Excerpt from My Trip to Utah
by Terry Barton, age 8

APPENDIX A

FUNCTION OF STRUCTURE WORDS^a

The function of the structure words of highest frequency is included in instruction along with the sight recognition of those words. Most of the instruction is through informal conversation which builds awareness, but children are expected to know that there is a real purpose for the meaningless words. Some of these purposes follow.

1. Some words are determiners. They mark nouns in sentences. In sentences they are words that pattern like the, a, my, our, this, that, every.
2. Some words are pronouns. They take the place of and refer to nouns in sentences, but the noun must be implied or stated for clear meaning. In sentences they are words that pattern like I, he, mine, you, him, she, her, it, we, they, them, many, none, several.
3. Some words are auxiliaries with verbs to aid in clarifying meanings related to tense and number. In sentences they pattern with verbs. Some are is, am, are, was, were, may, can, will, should, have, had.

^aSource: Allen (1976, p. 220).

4. Some words are prepositions. They mark nouns in sentences and often relate to place or position. In sentences they are words that pattern like of, in, by, on, to, at, from, under, about, over, through, around, up, with, toward.
5. Some words are conjunctions. They are useful in connecting words with words, phrases with phrases, clauses with clauses, and sentences with sentences. In sentences conjunctions pattern like and, but, or, yet, because, therefore, however, hence, furthermore, either . . . or, neither . . . nor, if . . . then, not only . . . but also.
6. Some words signal questions. In sentences they are words that pattern like who, where, when, how, why, what, which, whose, whom.
7. Some words are intensifiers. They alter feelings about meanings inherent in nouns and adjectives. In sentences they pattern like very, more, most, quite, somewhat, just, only, many, some.
8. Some words are miscellaneous signals. They are used as greetings and courteous responses and to register approval or disapproval. Some of them are hello, good-by, please, thanks, yes, no, excuse, sorry.

APPENDIX B

WORD PROCEDURE

Introduction

This procedure is one means by which stories written or dictated by children may be examined. Words which carry the greatest meaning load are highlighted in the application of the procedure. This is done by assigning point values to words according to their frequency of occurrence in written language. The most frequently used words, which tend to be structure words such as a, an, the, and, to, etc. are assigned lower point values than the less frequently used words. These high frequency structure words carry less meaning than the more rarely used form class words (nouns, verbs, adjectives, and adverbs). Therefore, the more rarely a word is used, the more weight it is given in the scoring process.

Thus a story with many unusual and colorful nouns, verbs, adjectives, and adverbs would yield a higher score than a story with fewer of these meaning-bearing classes of words.

A list of the 500 most commonly used words, from the Word Frequency Book by John Carroll and associates (1971), is used in the ranking process.

Directions

- Step 1. Obtain a selection of a child's language production. This may be a story written by the child or dictated by him to someone who writes it down.
- Step 2. From the selection choose a representative sample of at least 50 words.
- Step 3. Count the exact number of words in the sample, excluding proper nouns.

Step 4. Ranking and Tallying

- a. Use the alphabetical List of 500 Words to rank and tally the words in the sample.
- b. Each proper noun is given a weight of 1.
- c. If a word is not on the 500 List tally it under Rank 6.

Examples: "better" has a frequency listing of 261, so it would be tallied under Rank 3; "telescope" is not on the 500 List and not in the Word Box, so it receives a Rank of 6.

d. Words with affixes:

- (1) Words with affixes of tense (ran), number (runs), plural (boys), possessive (boy's), participle and other ing forms (running) are scored the same as the base form.
- (2) Irregular verb forms of the high frequency words are separately listed and are scored separately according to the weights shown in the list.
- (3) When comparative endings (funnier, funniest) are attached to the base word the whole word is scored 6 even though the base word occurs on the 500 List.
- (4) Words with derivational endings are scored 6 (helpful, completely, goodness, etc.) unless the complete word is separately listed on the 500 List.

- (5) Words with prefixes are scored 6 (unhappy, input, etc.) unless the complete word is separately listed on the 500 List.

Step 5. Computation of Weighted Scores

For each rank, multiply the total tallied frequency by the Rank number to obtain a weighted score.

- Step. 6. Divide the total weighted score by the number of words in the sample. This yields the final score.

Example:

Ranks	Frequency	Weighted Score
1 (1-100)	III	5
2 (101-200)	II	4
3 (201-300)	III	9
4 (301-400)	HTT	20
5 (401-500)	I	5
6 (others)	HTT HTT	10
Total weighted score:		102

$$\frac{\text{Total weighted score: } 102}{\text{No. of words in sample: } 51} = 2$$

INFORMATION AND DATA SHEET

Date _____

Title of selection _____ Examiner _____

Author _____ Age _____ Grade _____ School _____

Approximate reading level (if known) _____ Title and publisher of reading material used
 or by the child (author) _____

Indicate with an x:

written independently _____
 written with assistance _____
 dictated to examiner _____
 dictated to other than examiner _____

prose _____ poetry _____
 patterned language _____

Computation:

$\frac{\text{Total weighted score}}{\text{No. of words in sample}} =$ _____

divide by

Ranks	Frequency	Weighted Score
1 (1-100)		
2 (101-200)		
3 (201-300)		
4 (301-400)		
5 (401-500)		
6 (others)		
Total weighted score:		

Notes: Please note any special motivational techniques, environmental conditions or relevant information about the child who authored the story.

Word List Derived from 500 Most Commonly Used Words
Source: Carroll et al. (1971)

4	(1)	a	261	(3)	better
387	(4)	able	159	(2)	between
48	(1)	about	164	(2)	big
222	(3)	above	429	(5)	bird
263	(3)	across	328	(4)	black
369	(4)	add	462	(5)	blue
94	(1)	after	309	(4)	body
146	(2)	again	334	(4)	book
288	(3)	against	186	(2)	both
352	(4)	ago	436	(5)	box
166	(2)	air	213	(3)	boy
33	(1)	all	499	(5)	bring
225	(3)	almost	358	(4)	brought
177	(2)	along	401	(5)	build
469	(5)	already		(5)	built (see "build")
121	(2)	also	31	(1)	buy
189	(2)	always	27	(1)	by
382	(4)	among	96	(1)	call
39	(1)	an	124	(2)	came
3	(1)	and	38	(1)	can
213	(3)	animal	380	(4)	cannot
127	(2)	another	424	(5)	can't
410	(5)	anything	304	(4)	car
285	(3)	answer		(5)	careful
15	(1)	are			(see "carefully")
430	(5)	area	489	(5)	carefully
122	(2)	around	394	(4)	certain
16	(1)	as	284	(3)	change
195	(2)	ask	208	(3)	children
30	(1)	at	294	(3)	city
	(4)	ate (see "eat")	439	(5)	class
145	(2)	away	359	(4)	close
103	(2)	back	340	(4)	cold
457	(5)	ball	125	(2)	come
21	(1)	be	445	(5)	common
491	(5)	beautiful	406	(5)	complete
130	(2)	because	70	(1)	could
370	(4)	become	238	(3)	country
367	(4)	became	346	(4)	course
5	(1)	been	317	(4)	cut
105	(2)	before	454	(5)	dark
224	(3)	began	116	(2)	day
	(3)	begin see	486	(5)	deep
	(3)	beginning "began"	144	(2)	different
	(3)	begun	45	(1)	do
379	(4)	behind	131	(2)	does
182	(2)	below	83	(1)	did
262	(3)	best	303	(4)	didn't

- 388 (4) dog
- 318 (4) done
- 161 (2) don't
- 316 (4) door
- 84 (1) down
- 372 (4) draw
- (4) drawn (see "draw")
- 264 (3) during
- 47 (1) each
- 355 (4) early
- 229 (3) earth
- 329 (4) eat
- (4) eaten (see "eat")
- 466 (5) either
- 176 (1) end
- 216 (3) enough
- 133 (2) even
- 256 (3) ever
- 156 (2) every
- 494 (5) everyone
- 496 (5) everything
- 281 (3) example
- 248 (3) eyes
- 315 (4) face
- 311 (4) family
- 231 (3) far
- 418 (5) fast
- 239 (3) father
- 209 (3) feet
- 396 (4) feel
- 420 (5) felt
- 187 (2) few
- 473 (5) finally
- 87 (1) find
- 451 (5) fine
- 74 (1) first
- 397 (4) fire
- 324 (4) fish
- 297 (3) five
- 242 (3) follow
- 206 (3) food
- 231 (3) for
- 205 (3) form
- 220 (3) four
- 157 (2) found
- 468 (5) friend
- 23 (1) from
- 347 (4) front
- 404 (5) full
- 497 (5) game
- 335 (4) gave
- 101 (2) get
- 455 (5) girl
- 165 (2) give
- 306 (4) given
- 106 (2) go
- 472 (5) gone
- 107 (2) good
- 228 (3) got
- 151 (2) got
- 151 (2) great
- 399 (4) green
- (4) grew (see "grow")
- 338 (4) ground
- 319 (4) group
- 371 (4) grow
- 29 (1) had
- 321 (4) half
- 232 (3) hand
- 258 (3) hard
- 62 (1) has
- 25 (1) have
- 11 (1) he
- 64 (1) her
- 221 (3) head
- 280 (3) hear
- 282 (3) heard
- 488 (5) heavy
- 467 (5) held
- 141 (2) help
- 64 (1) her
- 280 (3) here
- 233 (3) high
- 67 (1) him
- 299 (3) himself
- 18 (1) his
- 411 (5) hold
- 163 (2) home
- 431 (5) horse
- 409 (5) hot
- 196 (2) house
- 49 (1) how
- 267 (3) however
- 415 (5) hundred
- 24 (1) I
- 363 (4) idea
- 44 (1) if
- 202 (3) important
- 6 (1) in
- 465 (5) instead
- 351 (4) inside
- 61 (1) into

10	(1)	it	160	(2)	name
7	(1)	is	359	(3)	near
97	(1)	just	230	(3)	need
207	(3)	keep	173	(2)	never
421	(5)	kept	108	(2)	new
223	(3)	kind	180	(2)	next
270	(3)	knew	241	(3)	night
100	(1)	know	71	(1)	no
348	(4)	known	30	(1)	not
210	(3)	land	359	(4)	nothing
192	(2)	large	423	(5)	notice
172	(2)	last	78	(1)	now
312	(4)	later	150	(2)	number
292	(3)	learn	2	(1)	of
495	(5)	leave	147	(2)	off
175	(2)	left	193	(2)	often
375	(4)	less	407	(5)	oh
240	(3)	let	149	(2)	old
381	(4)	letter	14	(1)	on
216	(3)	life	214	(3)	once
236	(3)	light	28	(1)	one
66	(1)	like	85	(1)	only
167	(2)	line	337	(4)	open
413	(5)	list	26	(1)	or
92	(1)	little	336	(4)	order
226	(3)	live	60	(1)	other
91	(1)	long	110	(2)	our
119	(2)	look	51	(1)	out
81	(1)	made	479	(5)	outside
72	(1)	make	82	(1)	over
113	(2)	man	169	(2)	own
89	(1)	may	226	(3)	page
55	(1)	many	257	(3)	paper
434	(5)	matter	132	(2)	part
112	(2)	me	456	(5)	past
269	(3)	mean	79	(1)	people
152	(2)	men	393	(4)	perhaps
179	(2)	might	408	(5)	person
275	(3)	mile	244	(3)	picture
478	(5)	mind	440	(5)	piece
301	(4)	money	134	(2)	place
476	(5)	moon	325	(4)	plant
63	(1)	more	295	(3)	play
19	(1)	most	293	(3)	point
305	(4)	morning	480	(5)	power
235	(3)	mother	427	(5)	probably
487	(5)	mountain	482	(5)	problem
314	(4)	move	142	(2)	put
94	(1)	much	461	(5)	question
129	(2)	must		(5)	quick (see "quickly")
80	(1)	my	449	(5)	quickly

403	(5)	ran	446	(5)	stop
171	(2)	read	251	(3)	story
398	(4)	ready	425	(5)	strong
341	(4)	really	246	(3)	study
323	(4)	red	136	(2)	such
343	(4)	remember	474	(5)	summer
392	(4)	rest	276	(3)	sun
118	(2)	right	268	(3)	sure
443	(5)	river	442	(5)	surface
460	(5)	road	498	(5)	system
286	(3)	room	342	(4)	table
453	(5)	round	138	(2)	take
332	(4)	run	471	(5)	taken
43	(1)	said	448	(5)	talk
117	(2)	same	152	(2)	tell
183	(2)	saw	417	(5)	ten
154	(2)	say	73	(1)	than
201	(3)	school	9	(1)	that
287	(3)	sea	1	(1)	the
247	(3)	second	52	(1)	them
68	(1)	see	53	(1)	then
302	(4)	seen	42	(1)	their
	(5)	seem (see "seemed")	52	(1)	them
419	(5)	seemed	37	(1)	there
260	(3)	sentence	58	(1)	these
168	(2)	set	19	(1)	they
283	(3)	several	140	(2)	thing
54	(1)	she	120	(2)	think
330	(4)	short	22	(1)	this
161	(2)	should	188	(2)	those
191	(2)	show	361	(4)	though
389	(4)	shown	185	(2)	thought
211	(3)	side	127	(2)	three
253	(3)	since	102	(2)	through
395	(4)	six	69	(1)	time
	(5)	slow (see "slowly")	6	(1)	to
441	(5)	slowly	265	(3)	today
165	(2)	small	194	(2)	together
59	(1)	so	273	(3)	told
56	(1)	some	114	(2)	too
184	(2)	something	218	(3)	took
219	(3)	sometimes	289	(3)	top
294	(3)	soon	296	(3)	toward
181	(2)	sound	405	(5)	town
350	(4)	space	307	(4)	tree
402	(5)	special	320	(4)	true
435	(5)	stand	272	(3)	try
362	(4)	start	290	(3)	turn
413	(5)	state	65	(1)	two
158	(2)	still	170	(2)	under
414	(5)	stood	475	(5)	understand

(5) understood
 (see "understand")
203 (3) until
 50 (1) up
310 (4) upon
300 (3) usually
174 (2) us
 88 (1) use
 93 (1) very
426 (5) voice
200 (2) want
470 (5) warm
 13 (1) was
500 (5) watch
 90 (1) water
 86 (1) way
 36 (1) we
135 (2) well
148 (2) went
 34 (1) were
 32 (1) what
 35 (1) when
 98 (1) where
450 (5) whether
 41 (1) which
178 (2) while
254 (3) white
 77 (1) who
279 (3) whole
139 (2) why
 46 (1) will
377 (4) wind
484 (5) winter
 17 (1) with
212 (3) without
 95 (1) word
126 (2) work
198 (2) world
 59 (1) would
109 (2) write
 (2) written (see "write")
 (2) wrote (see "write")
143 (2) year
400 (4) yes
373 (4) yet
 8 (1) you
 40 (1) your
274 (3) young

APPENDIX C

APPLICATION OF PROCEDURES TO PUBLISHED READING MATERIALS

I. Word Procedure Scores Obtained from Rankings of Allyn and Bacon Basic Reading Series (1970) and The Social Sciences--Concepts and Values (1970)

Allyn and Bacon Basic Reading Series (1970):

Level	Word Procedure Scores	
	Beginning of Text	End of Text
Primer	1.0	1.5
Grade 1 ²	1.5	2.0
Grade 2 ¹	1.8	2.3
2 ² to 3 ¹	2.5	3.0
3 ² to 4 ¹	3.1	3.3
Grade 4	3.3	3.3
Grade 5	2.8	3.6
Grade 6	2.8	3.6

The Social Sciences--Concepts and Values (1970):

Level	Word Procedure Scores	
	Beginning of Text	End of Text
Level 2	1.4	2.9
Level 3	2.8	2.9
Level 4	2.8	3.1
Level 5	2.8	3.3
Level 6	3.3	3.5

II. Word Procedure Scores Obtained from Rankings of New
Basic Readers (1962) and The Social Sciences (1970)

New Basic Readers (1962):

Level	Two-Four Procedure Scores from Mid-point of Text
Junior Primer	5.1
Primer	6.8
Book 1 ²	7.1
Book 2 ²	11.5
Book 3 ¹	12.0
Book 3 ²	12.8
Book 4	14.0
Book 5	26.0
Book 6	21.0
Book 7	22.0

The Social Sciences (1970):

Level	Two-Four Procedure Scores from Mid-point of Text
Level 2	6.6
Level 3	14.2
Level 4	17.5
Level 5	13.5
Level 6	22.7

APPENDIX D

TWO-FOUR PROCEDURE

Introduction

The Two-Four Procedure is one means by which stories written or dictated by children may be examined. As a measure of sentence complexity, the procedure is based upon the rationale that the deeper the main elements of a sentence are buried within that sentence, the more difficult it is to read. When subject and verb are embedded within complex structures it becomes more difficult for a reader to determine (1) who or what the sentence is about; and (2) what action or condition is being described.

The Two-Four Procedure assesses difficulty of sentence structure by counting and scoring two types of complex elements:

1. Prenominals--words which precede the subject of the sentence. These words postpone the reader's identification of who or what the sentence is about.

prenominals

Example: Running for his life, Bill quickly reached the forest.

2. Postnominals--words which intervene between the subject and the main verb of the sentence. These words require the reader to hold the subject in his memory while he locates the verb and "resolves" the sentence.

postnominal

Example: Running for his life, Bill quickly reached the forest.

TWO-FOUR PROCEDUREInformation and Data Sheet

Date _____

Title of selection _____ Examiner _____

Author _____ Age _____ Grade _____ School _____

Approximate reading level (if known) _____ or Title and publisher of reading material used by the child (author) _____

Indicate with an X:

written independently _____
 written with assistance _____
 dictated to examiner _____
 dictated to other than examiner _____

Notes: Please note any special motivational techniques, environmental conditions, or relevant information about the child who authored the selection.

prose _____ poetry _____
 patterned language _____

Step 1. Classify and Count (If you wish to score more than five sentences, divide columns down the center.)

Sentence No.	1	2	3	4	5	Totals	Weighted Score
Prenominals							x 2 =
Postnominals							x 4 =
All other words							x 1 =
							Total:

Step 2. Compute the Two-Four Score (Round to nearest whole number.)

(divide) $\frac{\text{Total weighted score}}{\text{No. of sentences in selection}} = \text{_____} = \text{_____}$ (Two-Four Score)

Step 3. Compare Two-Four Score with Interval Scale. Circle ranking of sentence structure difficulty for the selection.

Interval Scale

<u>Two-Four Score Intervals</u>	<u>Rankings of Sentence Structure Difficulty</u>
0 - 5.9	1 (Basic Level)
6 - 10.9	2
11 - 15.9	3
16 - 20.9	4
21 - 25.9	5 (Challenge Level)
26 and above	Above Challenge Level

Directions

Step 1. Classify and count

- a. Obtain a selection of a child's language production. This may be a story written by the child or dictated to someone who writes it down.
- b. From the selection choose a continuous, representative sample of at least five sentences. (For shorter stories, use the entire story as your sample.)
- c. For each sentence in the selection
 - (1) Count any words which precede the subject of the sentence. Enter the number on the data sheet by the heading "Prenominals."
 - (2) Count any words which intervene between the subject and the main verb. Enter the number on the data sheet by the heading "Postnominals."
 - (3) Count all remaining words, including subject and verb. Enter the number by the heading "All other words."

Example: My yellow cat, meowing loudly, sat outside the door.

Count:	
Prenominals:	2.
Postnominals:	2
All other words:	5

Step 2. Compute the Two-Four Score

- a. Multiply total Prenominals by 2.
- b. Multiply total Postnominals by 4.
- c. Add Prenominal score, Postnominal score, and number of all other words.
- d. Divide this sum by number of sentences in the selection, to obtain the Two-Four Score. (An average sentence score.)

2. Directions, commands, and other "subject understood" sentences.

Find the noun which is the most important element in the sentence. This noun will often occupy the position of an "object" in the sentence. Count all words which precede this noun as prenominals. Count the rest of the words as "all other words."

Example: prenominals
 {
 Color the bear brown.

Prenominals: 2
Postnominals: 0
All other words: 2

3. Verb expansions.

In the case of "helping" verbs (forms of "be" and "have") or modals (can, will, should, may, might) find the main verb and count all words that come between subject and main verb as postnominals.

Example: postnominals
 {
Jerry may have been hiding
 since yesterday.

Prenominals: 0
Postnominals: 3
All other words: 4

4. Compound subjects.

Identify the first noun in the series as the subject. Make all pre- and postnominal counts accordingly.

Example: postnominals
 {
Harry, Sally, and Joe rode
 bicycles to town.

Prenominals: 0
Postnominals: 3
All other words: 5

5. Compound verbs.

Identify the last verb in the series as the main verb. Make all pre- and postnominal counts accordingly.

Example: postnominals
 {
Kittens play and dig in
 their sandbox.

Prenominals: 0
Postnominals: 2
All other words: 5

6. Compound sentences.

- a. When two sentences are joined by "and," score as two separate sentences. Count the "and" as a prenominal for the second sentence.

Example: Ann pulled weeds and Cindy mowed the lawn.

Ann pulled weeds . . .
 prenominal
 . . . and Cindy mowed the
 lawn.

Prenominals: 0
Postnominals: 0
All other words: 3
Prenominals: 1
Postnominals: 1
All other words: 4

- b. All other compounds (such as those joined by but, or, so, for, although, yet) should be scored as one long sentence.

Example: Bill looked for the car, but
 he couldn't find it anywhere.

Prenominals: 0
Postnominals: 0
All other words: 11

7. Dialogue and narrative combinations.

Count all words in the sentence as if they were prenominals. Weighting each word by the prenominal factor of 2 gives credit for the complexity of mixed dialogue and narrative structures.

Example: Carla said, "Here is a good
 picnic spot."

Prenominals: 8
Postnominals: 0
All other words: 0

APPENDIX E

RATERS' RANKINGS OF DIFFICULTY LEVEL OF GILMORE^a
ORAL READING TEST PASSAGES

Word Procedure Rankings

Rater Number	Test Passages					
	I	II	III	IV	V	VI
1	1.9	3.0	2.3	2.5	3.4	3.6
2	1.8	2.2	2.1	2.1	2.6	3.3
3	1.5	2.5	1.6	2.1	2.4	2.7
4	1.9	2.3	2.3	2.4	3.4	3.2
5	1.6	2.2	2.2	2.1	3.0	3.6
6	1.8	3.3	2.2	2.1	1.5	3.4
7	1.8	2.3	2.1	2.0	3.0	3.3
8	2.1	2.7	2.1	2.2	2.9	3.4
9	1.5	2.5	1.8	2.2	2.9	3.5
10	1.9	2.4	2.2	2.6	3.2	3.2
11	1.5	2.2	1.9	2.0	2.3	3.2
12	1.8	2.3	2.1	2.2	2.7	3.6
13	1.8	2.0	2.0	2.1	3.1	3.3
14	1.9	3.0	2.3	2.5	3.4	3.2
15	1.8	2.2	2.1	2.1	2.6	2.9
16	1.5	2.5	1.6	2.1	2.4	3.4
17	1.0	1.7	1.5	1.5	1.3	3.3
18	1.8	2.3	2.1	2.0	3.0	3.0
19	1.5	2.3	1.8	2.3	2.5	3.2
20	<u>1.1</u>	<u>2.7</u>	<u>2.0</u>	<u>2.5</u>	<u>3.0</u>	<u>3.4</u>
Totals	33.5	48.6	40.3	43.6	54.6	65.7
Means	1.68	2.43	2.01	2.18	2.73	3.29

^aSource: Gilmore (1952).

Two-Four Procedure Rankings

Rater Number	Test Passages					
	I	II	III	IV	V	VI
1	3.0	14.0	12.0	14.0	12.5	9.5
2	5.2	7.2	9.7	17.2	9.6	21.0
3	5.0	10.0	14.0	17.0	15.0	11.5
4	2.5	6.0	16.0	9.8	6.8	8.1
5	6.0	4.8	12.4	9.0	13.0	21.0
6	8.4	8.0	13.0	13.6	12.5	14.1
7	4.7	9.0	8.9	28.4	17.0	21.0
8	4.6	9.1	15.3	17.2	9.6	10.5
9	6.0	7.2	9.7	24.0	27.0	37.0
10	4.0	12.0	12.0	14.0	6.0	9.0
11	5.0	5.0	12.0	12.0	12.0	12.0
12	4.8	6.0	16.0	9.8	6.8	8.1
13	2.5	6.1	8.1	13.0	13.0	21.0
14	6.0	4.8	12.4	14.5	12.5	9.5
15	4.8	8.0	9.0	13.8	9.6	21.0
16	5.2	7.1	12.1	9.1	15.0	11.5
17	8.2	13.4	9.2	25.2	6.8	9.1
18	2.5	6.1	9.0	13.0	13.0	21.0
19	3.0	5.4	12.2	16.2	12.5	14.1
20	4.8	9.0	10.3	9.2	17.0	21.0
Totals	96.2	158.2	233.3	300.0	247.2	310.0
Means	4.81	7.91	11.66	15.00	12.36	15.50

APPENDIX F

RATERS' EVALUATION OF PRACTICALITY OF WORD PROCEDURE
AND TWO-FOUR PROCEDURE

Ease-of-Scoring Ratings by Three Groups

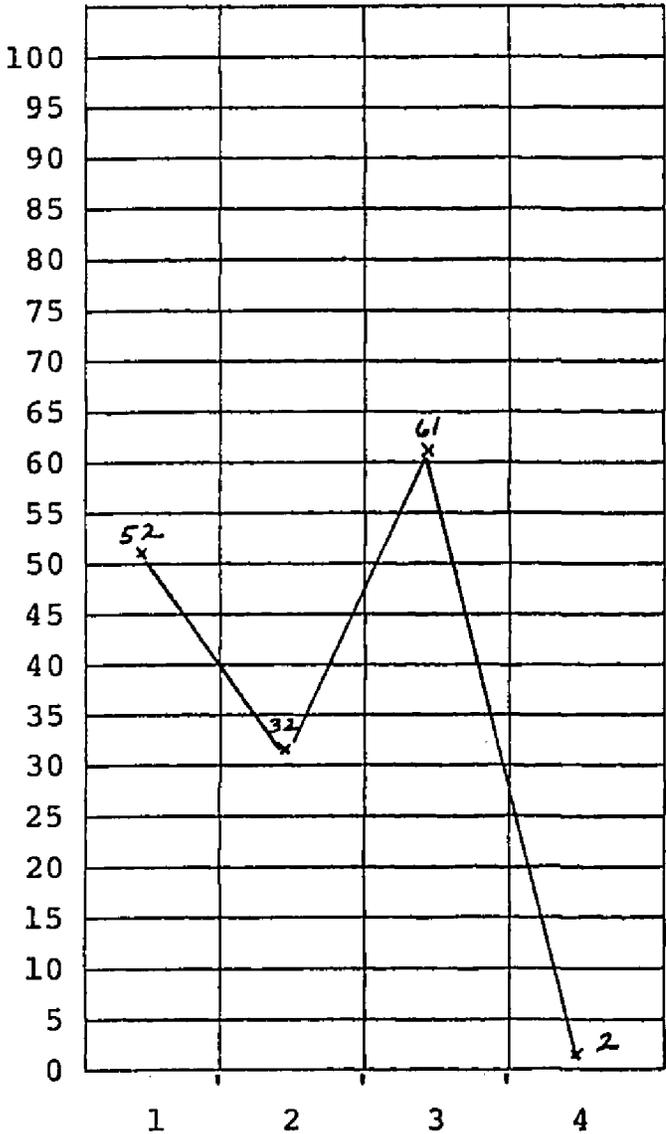
Groups	Word Procedure	Two-Four Procedure
<u>Students:</u>		
1	2.5	4.0
2	2.0	3.5
3	1.5	3.5
4	2.5	4.0
5	3.0	3.0
6	2.0	3.0
7	3.5	2.5
8	2.5	3.5
9	3.0	4.5
10	<u>2.5</u>	<u>3.5</u>
	Mean Ratings: 2.5	3.5
<u>Teachers:</u>		
1	2.0	3.5
2	1.0	4.0
3	1.5	3.0
4	1.0	2.5
5	1.5	3.0
6	2.5	3.5
7	1.0	2.0
8	1.0	2.5
9	1.5	3.0
10	<u>2.0</u>	<u>3.0</u>
	Mean Ratings: 1.5	3.0
<u>Aides:</u>		
1	2.5	3.5
2	1.5	4.5
3	1.0	3.5
4	3.0	4.0
5	2.0	3.5
6	2.0	3.5
7	2.0	4.0
8	2.5	3.0
9	2.0	3.0
10	<u>1.5</u>	<u>2.5</u>
	Mean Ratings: 1.5	3.0

Ease-of-Interpretation Ratings by Three Groups

Groups	Word Procedure	Two-Four Procedure
<u>Students:</u>		
1	2.5	5.0
2	3.0	4.5
3	2.5	3.5
4	3.5	3.0
5	2.0	4.0
6	2.5	3.5
7	2.0	4.5
8	1.5	4.0
9	2.5	4.0
10	<u>3.0</u>	<u>4.0</u>
	Mean Ratings	2.5
		4.0
<u>Teachers:</u>		
1	1.5	4.0
2	2.5	3.5
3	1.5	3.5
4	1.0	4.0
5	3.0	3.0
6	2.0	3.0
7	2.0	2.5
8	2.0	3.5
9	2.5	4.5
10	<u>2.0</u>	<u>3.5</u>
	Mean Ratings	2.0
		3.5
<u>Aides:</u>		
1	2.5	4.0
2	2.5	5.0
3	2.5	4.5
4	2.0	3.5
5	1.5	3.5
6	3.0	3.0
7	2.0	4.0
8	3.5	4.5
9	2.5	4.0
10	<u>3.0</u>	<u>4.0</u>
	Mean Ratings	<u>2.5</u>
		4.0

APPENDIX G

INDIVIDUAL READER PROFILE



NAME Kelley

Grade/Age 2 1/2

Reading Level 2'

Rankings: 1
3
2
4

Range: 59

Misconception:

Story 3 - Good things in box.
Family went on a vacation to Spain.

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