Case Studies of Grade-Level Effects on Children's Miscues and Reading Comprehension

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Au cours de la dernière décennie, il y a eu un changement d'orientation dans les recherches portant sur la lecture. Il y a aujourd'hui un consensus qui est en train de se faire: la lecture est un processus de sélection plutôt qu'un processus de précision. Quand nous lisons un texte, nos expériences antérieures et nos connaissances linguistiques nous permettent de retenir seulement ce qu'il nous faut et de personnaliser les intentions de l'auteur. Il n'est donc pas nécessaire de distinguer chaque lettre et chaque mot d'un texte. En faisant l'examen des erreurs de lecture d'un jeune enfant, nous pouvons comprendre comment le lecteur intègre ses connaissances linguistiques et ses expériences antérieures à la relation son/symbole de l'imprimé.

Cette étude se veut une analyse en profondeur des erreurs d'un lecteur pour préciser (1) les conséquences de la scolarité sur le type d'erreurs commises et (2) les conséquences des diverses erreurs sur la compréhension. L'analyse de nos données nous a permis de découvrir que plus la scolarité est faible, plus il y a d'erreurs. Les retours en arrière (regressions) sont des erreurs qui reviennent souvent; le lecteur veut par là corriger la compréhension imparfaite qu'il a du passage qu'il vient de lire, par l'obtention d'un supplément d'information.

The purpose of this study is twofold: first, to determine whether grade 2 and grade 4 pupils interact with reading material in different ways, thereby producing different kinds of reading miscues; and second, to determine the extent to which the different miscues affect reading comprehension. The research is based upon the premise that reading involves the simultaneous application of cueing strategies in order to derive meaning from printed material; namely the processing of (a) grapho-phonic information or sound/letter relationships, (b) syntactic or grammatical cues, (c) semantic or meaning cues, and (d) respective interactions of (a), (b), and (c).

In the past, reading has been viewed as a precise process that involves exact, detailed, and sequential perception and identification of letters, words, spelling patterns, and large language units. Phonics-centered approaches have stressed *letter* identification, and word-centered approaches have stressed *word* identification. These emphases are still foremost in the teaching of reading throughout North America, though tacit recognition is given to the fact that reading also involves comprehension.

In recent years Kenneth and Yetta Goodman, along with Carolyn Burke, have presented an alternative explanation of the reading process. They

conceptualize reading as a selective procedure – one in which the reader uses only part of what is on the printed page, plus what he already knows about the structure of the language and whatever background knowledge and experiences he can marshall in order to "figure out" what is before him. From the composition of these three elements the reader arrives at *his* rendition of what he *thinks* the author has intended.

Thus, Kenneth Goodman refers to reading as a "psycho-linguistic guessing game" involving the simultaneous application of at least three cueing systems, which are referred to as the grapho-phonic, the syntactic, and the semantic sources of information. Learning to read requires the application of all three systems; this involves the ability to react to what is read through checking validity, evaluating, making inferences, and drawing conclusions. The reader selects as much information from each system as is necessary for him to "guess" or "predict" what is written. If the "guess" does not sound like language, or if it lacks meaning, the reader must discard the "guess" and regress, or go back, for more information – especially grapho-phonic information.

The reader's usage of the three cueing systems is determined by the strategies employed in the reading act. We cannot hear what a child reads during silent reading; therefore, we rely on oral reading to provide insight into the strategies employed. But we cannot tell what methods are employed if the reader reads correctly; therefore, we must examine oral reading errors or miscues on the assumption that the same cues trigger incorrect responses as trigger correct responses.

By looking at oral reading errors or miscues in this way, we can begin to understand why some readers gain more information than others from the printed text. The student who relies too heavily on grapho-phonic cues without optimal use of syntactic and semantic cues is unlikely to comprehend adequately. A student who relies more on syntactic and semantic cues, even though making frequent grapho-phonic errors, may have high comprehension. To date little is known about the relative differences between the cueing strategies used by children at different age and grade levels. It seems plausible to hypothesize, nevertheless, that the association between the length of reading experience, or grade level, and the degree of meaning gained from printed material, or comprehension, will be different for children who place differing emphases on the reading strategies described. For this reason extended analyses of grade-level effects on the relationships between children's miscues and reading comprehension seem to constitute a potentially profitable line of inquiry.

REVIEW OF RELATED RESEARCH

The past decade in reading research has witnessed notable changes in both methodology, with an emphasis on constructing models of reading (cf.

Davis, 1971) and theory, with an emphasis on the syntactic and semantic components of reading being considered as the basis of comprehension (Carroll, 1970, 1971; Goodman, 1969, 1971, 1972; and Smith, 1971, 1973). Investigators have shifted emphasis from reading primarily conceived of as a series of careful visual perceptions, with research focussing on grapho-phonic skill, to reading as a highly complex multi-factor and integrated process. Huey (1908) and Thorndike (1917), noted exceptions to early investigators, generated the interrelated and complex concepts of reading that have formed the basis for much of the research and theorizing that has occurred within the last ten years. For example, Kolers (1970), when analysing the errors of adult readers, found that the visual components of reading had been overstressed at the expense of syntactic and semantic considerations. Supporting Kolers' findings are Hochberg (1970) and Hochberg and Brooks (1970), who suggest that by utilizing syntactic and semantic knowledge and peripheral vision, a skilled reader fixates *only* on those parts of the visual array that he anticipates will enable him to check his guesses about what is being said. This in turn will help him formulate further anticipations. The better the reader the larger the fixation unit from which he samples the text, and the more likely that words will be decoded by the rapid and easily apprehended features of that word.

Goodman, R. L. Thorndike (1973/74), Carroll, and Smith have all supported these ideas and readily subscribe to Edward Thorndike's (1917) view of the reading process.

> Reading is a very elaborate procedure, involving a weighing of each of many elements in a sentence, their organization in the proper relations one to another, the selection of certain of their connotations and the rejection of others, and the cooperation of many forces to determine final responses. In fact . . . the act of answering simple questions about a simple paragraph . . . includes all the features characteristic of typical reasoning. [p. 323]

Robert L. Thorndike (1973/74) has pursued the concept of "reading as reasoning" and posits that once basic decoding skills are mastered, performance in reading indicates the thinking and reasoning level of the reader and may, therefore, be a potentially powerful predictor of academic performance. Reading, then, becomes a process that must involve some depth of understanding beyond word meaning. A transformation of visual input, through interaction with the reader's existing knowledge, occurs and is generated as comprehension (Goodman, 1965). It has long been recognized that every reader brings with him to a reading situation a variety of experiences, background, and language knowledge which enables him to react to printed material in logical and well-informed ways which constitute "thinking" and "reasoning" (Carroll, 1970). As the reader encounters printed material in this manner, he performs a highly complex and integrated skill.

Researchers and practitioners agree that errors made by readers are indicators of reading performance. Thus, for several years, oral reading errors have been subjected to analysis. Rosemary Weber (1968) has reviewed more than thirty studies based on such data and has classified the research into two groups with two distinct concerns. One group was concerned with establishing norms for diagnosing reading weaknesses in order to provide starting points for remedial instruction. This group generally viewed errors as signs of imperfect learning in problem readers. The other group analyzed errors in an attempt to provide insight into the nature of the reading process. Rather than prejudging errors as "undesirable," they used them as (mis)cues for diagnosing and delineating the decoding strategies used by successful readers when deriving meaning from print. Most of these studies, however, focussed on words or letters or both, and exhibited a notable lack of concern for the linguistic function of errors by disregarding how closely an unexpected response resembled an expected response.

Since 1964 a series of studies has been conducted at Wayne State University under the direction of Kenneth S. Goodman, in close association with Yetta Goodman and Carolyn Burke. The investigators have attempted to examine the nature of reading as a psycholinguistic process by focussing on the study of language (linguistics) and the study of language learning (psychology). The Goodman-Goodman-Burke research has been reported in many papers (K. Goodman, 1965, 1967, 1969; K. Goodman & Burke, 1969; K. Goodman, 1970; and K. Goodman & Burke, 1970), in project reports (K. Goodman, 1968; K. Goodman & Burke, 1969; and Y. Goodman, 1971), and in articles in books (K. Goodman, 1970; K. Goodman & Niles, 1970; K. Goodman, 1972; and K. Goodman, 1973). The insights gained from their research have culminated in a tentative reading theory – referred to as a "psycholinguistic guessing game" – which incorporates linguistic and psychological principles based upon observed reading behavior (Goodman, 1967), and a taxonomy of reading cues and miscues (Goodman & Burke, 1970) for in-depth analysis and study of oral reading strategies and techniques. Since reading involves the interaction of thought and language, the taxonomy organized miscues according to linguistic and psychological characteristics. It was then used to classify the miscues of children while reading stories which were moderately difficult for them and which they had never seen before. The resultant miscue analysis provided insight into the degree of interplay of grapho-phonic, syntactic, and semantic information exhibited by the child in decoding graphic display into meaning, followed by its subsequent encoding into spoken language. A Reading Miscue Inventory (RMI), based on the taxonomy, was then developed by Yetta Goodman and Carolyn Burke to provide classroom teachers with a workable approach to understanding the reading process as it operates for individual readers.

METHOD OF INVESTIGATION

Sample and Technique

The Reading Miscue Inventory produced by Yetta Goodman and Carolyn Burke formed the basis of this investigation. The steps and procedures as outlined in the kit were followed in an effort to determine (1) the most prevalent kinds of miscues made by each group of Grade 2 and Grade 4 students, and (2) what effect the kinds of miscue had upon an individual's comprehension.

In this study four boys were selected who had been placed in "top" reading groups within their classes, two from second grade and two from fourth grade. The subjects within each grade read the same unfamiliar story – "A Day at Home" for Grade 2 and "Space Pet" for Grade 4 – taken from the Reading Miscue Inventory. The boys were told that this was not a test; rather that the investigator was trying to discover what kinds of "mistakes" or "miscues" children make while reading and why they seemed to make them. They were also told that no help would be given to them and therefore to "do the best they could" with any unfamiliar words. Each child was then asked to read the story aloud and told that he would be asked to retell it in his own words after he had finished reading. It should be pointed out that each child was worked with separately, usually on different days. The reading and retelling were audio-taped, and later the reading was marked for miscues on a typed script of the story and the retelling was evaluated to produce a retelling score. A series of questions to stimulate retelling was used when necessary.

Instrument

The RMI is based on the assumption that the quality of miscues is more important than the quantity of miscues. All miscues are not "equal," because some retain grammatical and semantic acceptability and therefore detract little from total comprehension, while others distort meaning considerably. While the RMI does take into consideration the number of miscues made, the emphasis is on qualitative analysis, which evaluates *why* miscues are made, assuming that they are cued by the language and thought that the reader brings to the reading situation as he attempts to extract meaning from print.

The miscue inventory supplies the investigator with a series of questions which enable him to determine the quality and variety of the reader's miscues. These questions focus on the meaning of the text being read and allow the investigator to analyze how effectively the reader uses language cues and experiential information.[1] The data provided by the inter-relationship of these factors (print, language, and experience) is then used to construct a Reader Profile chart which, when compared with the re-telling score, shows how well a reader utilizes the three reading strategies.

FINDINGS AND INTERPRETATION

Three major findings emerged. (See Tables 1 and 2.) First, the percentage of total miscues was higher for Grade 2 subjects than for Grade 4 subjects, with the greatest differences occurring in substitutions, repetitions for the purposes of correcting, and unsuccessful attempts to correct. This result is not surprising, since Grade 2 subjects have not had as much time as Grade 4 subjects to develop the same degree of sophistication in their reading strategies. The findings seem to indicate that miscues are a natural and necessary part of learning to read. A beginning reader who is not efficient in eliminating alternative guesses makes more guesses, checks his guesses more often, and then regresses to correct or gain more graphic information before proceeding than does a more mature reader who has been through the initial process and has thereby developed relatively sophisticated tactics or skills for making more accurate predictions. This finding supports Yetta Goodman's (1971) longitudinal study report on miscues, in which she states that more advanced readers tend to use reading strategies more efficiently than less advanced readers and seem to have better judgment about when to emphasize the use of one strategy over the other.

Second, a higher percentage of the miscues made by Grade 4 subjects were similar in sound and symbol configuration (i.e. grapho-phonically)

Table 1 / Miscues of Four Subjects (Grade 2 and Grade 4 Levels)

	Grade 2				Grade 4			
	Subject 1		Subject 2		Subject 3		Subject 4	
Kind of miscue	No.	%	No.	%	No.	%	No.	%
Substitution	18	8	13	6	21	3	13	2
Omission	—	—	4	2	3	0.5	—	—
Insertion	2	1	—	—	2	0.5	—	—
Reversal	—	—	—	—	—	—	—	—
Repetition								
Correcting a miscue	13	6	2	1	14	2	13	2
Abandoning correct form	—	—	—	0.5	—	—	—	—
Correction unsuccessful	4	2	3	1	2	0.5	5	0.5
Anticipating difficulty	—	—	1	0.5	6	1	5	0.5
Incidental changes								
Partial words	—	—	—	—	—	—	—	—
Non-word substitution	3	1	—	—	3	0.5	2	0.5
Dialect difference	—	—	—	—	—	—	1	0
Intonation shift	—	—	1	0.5	2	0.5	1	0
TOTALS	40	19	25	12	53	7	40	5

Note: "No." = number of times the miscue occurred; "%" = percentage per 100 running words. Since the Grade 2 story was much shorter than the Grade 4 story, percentage is the key factor and not the number of miscues.

to the expected response than were those of Grade 2 subjects. This result is surprising, since it is a widely held belief that beginning readers *must* rely heavily on phonic skill in order to "figure out" what the words on the page say. However, in both grades the students automatically replaced nouns with nouns and verbs with verbs (etc.) most of the time. This seems to indicate a high degree of familiarity with the structure of the language, and a familiarity that is being utilized in syntactic cueing strategies during reading. Despite the fact that most replaced words were functionally the same, they did not *always* allow the reading to sound like acceptable language.

Third, Grade 4 subjects were both moderately effective in their use of reading strategies, but Grade 2 subjects varied considerably in their ability to use such strategies effectively. It should be pointed out that Subject 1 in Grade 2, who consistently scored above his counterpart, was almost one year older. This result lends support to the idea that as maturation progresses, reasoning and thinking abilities also progress. Therefore, it would be the level of these thinking and reasoning processes that influenced reading strategies and not the grade level per se.

Because such a wide variation in comprehension as measured by the retelling score exists within each grade level, it is impossible, with a sample so small, to compare the kinds of miscues made within a grade to comprehension for that grade. A more fruitful approach may be an examination of an individual's miscues and their relation to comprehension.

Table 2 / Grapho-phonic, Syntactic, and Semantic Relationships of Miscues of Four Subjects (Grade 2 and Grade 4 Levels)

	Grade 2		Grade 4	
	Subject 1	Subject 2	Subject 3	Subject 4
Grapho-phonic relationships				
% of high sound relationships	46	35	68	76
% of high graphic relationships	57	47	82	83
Syntactical relationships				
% of identical grammatical functions	73	63	76	83
% of strong grammatical relations	53	26	31	36
Semantic relationships				
% of no loss + partial loss comprehension	84	48	85	80
Retelling score	83	46	61.5	37.5
Use of reading strategies	highly effective	some effective	moderately effective	moderately effective

Subject 1, in Grade 2, is the most efficient reader grade-wise. Many of his scores are similar to those of the most efficient reader in Grade 4 (Subject 3) with a notable and significant difference in the retelling or comprehension score. The investigator concludes that both subjects have good syntactical control of their reading, but Subject 1 regressed more often to correct semantically unacceptable words; thus, "started" was corrected to "stayed," "houses" was corrected to "hoses," "smock" was corrected to "smoke," and "crept" was corrected to "kept." Subject 1 was therefore able to gain more meaning from the story and to achieve a higher retelling score. Secondly, although Subject 1 had more substitutions than Subject 3, it was found upon close scrutiny that his substitutions were closer in meaning to the expected response than were those of Subject 3. For example, "going" was substituted for "go" and "once" for "one" by Subject 1, while "takes" was substituted for "wakes" and "coast" was substituted for "cost" by Subject 3. This apparently allowed Subject 1 to retain up to 84 per cent of the word-meaning in his miscues, a level as high as that of Subject 3, who made fewer of every kind of miscue. Consequently, Subject 1 lost little meaning in the story and appears to understand that reading is for gaining meaning. He appears to be *striving toward using* all of the cueing systems in a selective manner, and thereby confirms the interplay of syntactic, semantic, and grapho-phonic information in the reading process of a beginning reader.

Subject 2 in Grade 2 read more smoothly than Subject 1 and made fewer substitutions, but the substitutions were serious because the meaning was usually distorted even though grammatical function was often retained. Subject 2 corrected miscues on only two occasions, though his facial expression while reading indicated that what he was reading was not always understood. Subject 2 lost over half of the word-meaning on miscued words and scored only 46 on comprehension. These scores indicate that he is "somewhat" effective in using reading strategies and that he is probably relying heavily on the grapho-phonic cueing system at the expense of the syntactic and particularly the semantic cueing systems.

Subject 4 is a mystery! This child read fluently, with good expression, and was the only subject eager to read for the investigator. For the most part, his miscue scores compare favorably with those of the other Grade 4 child. There is, however, an unexpected drop in the grammatical correctness of his miscues and in his retelling score. Yet his loss of comprehension on miscued words is very little. It seemed, while listening to this child read and while scoring the kinds and number of miscues that he made, that he was effective in the use of reading strategies and should, therefore, gain meaning from the story. However, upon close analysis of his substitution words, it was found that one serious error occurred about halfway through the reading and continued to be repeated for the duration of the story.

"Oxen" was substituted for "oxygen," and at no point was any attempt made to correct it. Syntactically it was acceptable, but it completely changed the meaning of the remainder of the story. Since only one word was seriously distorted, the percentage of no loss / partial loss of comprehension of miscued words was not significant. Even though the child seemed rather puzzled while reading, he was unwilling to regress to correct or to gain additional meaning.

According to the Reading Miscue Inventory, there are two possible explanations for this kind of low-comprehension performance associated with apparent verbal fluency during the reading task. One, the reader has become proficient at oral reading and believes that an exact rendition of what is printed is the most important aspect in reading. Most likely his concentration was on performance rather than on gathering meaning, and this could account for "no correction" when meaning seemed to be disturbed. Two, the reader is proficient at understanding when he reads material that is familiar to him, but has great difficulty with unusual writing styles or with unfamiliar subject matter. The investigator suggests a third possibility. This child may actually have had good comprehension but found it difficult to remember or recall most of what he understood, especially since it was obvious that he was zealously trying to please the investigator. It appears, however, that the surface reading of Subject 4 resembled that of a proficient reader, but his retelling score indicated low comprehension.

IMPLICATIONS FOR RESEARCH AND TEACHING

The above analysis, even though based on a small sample, seems to indicate that it is *not* the grade level of the reader that is most significant in determining the strategies or cues used by readers as they interact with print in an attempt to gain meaning from that print. Rather, it is the strategies and cues of a given individual that give most insight into the process of reading. The kind of strategies and cues used may be a function of the individual's stage of thinking, or perhaps they are developed concurrently in the process of learning to read. Readers seem to vary a great deal within a grade, and even within a reading group within the grade. It is therefore imperative that a larger number of subjects be diagnosed in order to establish significant levels of association between grade level and comprehension or between grade level and types of miscue. The K. Goodman and Burke (1969) report on oral reading miscues and grammatical transformations gives evidence that certain kinds of reading miscues are indicative of particular developmental reading phases, and that the structure of the written material influences the kind and percentage of reading miscues that occur. A logical follow-up of the present investigation, then, would be to expand the sample base and attempt to determine whether the two most

significant types of miscues made in the present study (substitution and repetition for correction) are associated with increasing reading skill and/or the kind of materials being read – that is, stories or content reading.

The present study appears to have four major implications for classroom teachers.

1. Too much emphasis is probably placed on prompting or correcting children as they read orally. Rather, they should be encouraged to detect and correct their own miscues by realizing that they are not grammatically or semantically sound. Regressing to reread or to correct should be encouraged rather than discouraged.
2. Such comments as "Stop guessing and look at the word!" are out of order since reading is, in fact, a "psycholinguistic guessing game" (Goodman, 1967). "Guess again!" may be a more accurate response.
3. Children need to be assisted in developing reading strategies that enable them to become unaided readers as they use grammatical and semantic cues *as well as* grapho-phonic cues in their reading. If syntactic and semantic strategies fail, it may be timely to teach vowels, blends, prefixes, suffixes, compound words, or new vocabulary as keys to unlocking meaning from print. Teaching skills as isolated procedures is no assurance that the reader can, or will, use that skill during the reading process. It may be wiser to teach skills as children require them.
4. The material that children read must be meaningful or understandable to them within the language and the concrete and vicarious experiences that they bring to the reading situation. Recently, many educators have suggested that reading materials be made available that are more in tune with children's backgrounds and language experiences. Another approach is to develop children's listening and speaking abilities through a developmental listening and speech program, particularly at the primary level. Central to this idea is the necessity of many hours being spent in reading to the children so that they become familiar with the grammatical construction used in books, with the redundant nature of our language, and with concepts they have not as yet encountered. Such "props" assist a reader in anticipating and predicting syntax and meaning within a story.

It is ironical that, after more than half a century of research on reading, the practical implications stemming from this study are reminiscent of practical suggestions made by Huey and Thorndike, who in the early 1900s initiated the perspective on reading adopted in this paper. Implications numbered 1 and 4 above are similar to the suggestions of Huey, while implications 1 and 3 are more like those of Thorndike.

> The school should cease to make primary reading the fetish that it has long been, and should construct a primary course in which reading . . . [is] always for meanings. . . . Word pronouncing will therefore always be secondary to getting whole sentence meanings. . . . Until the speech habits are well formed, the school should

have much more oral work other than reading . . . . School readers, especially primers, should largely disappear, except for the real literature of mother tongue, presented in literary wholes, or as they may be records of the children's own experiences and thoughts, or as they may be books needed for information in the everyday life of the school. [Huey, 1908, pp. 380–381]

In school practice it appears likely that exercise in silent reading to find answers to given questions, or to give a summary of the subject matter read, or to list the questions which it answers, should in large measure replace oral reading. . . . Perhaps it is in their outside reading of stories and in their study of geography, history and the like, that many school children really learn to read. [E. L. Thorndike, 1917, p. 332]

NOTES

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1. For a more detailed description of qualitative analysis see Y. Goodman (1972); Y. Goodman & Burke (1973).

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