

**Biemiller A.** The development of the use of graphic and contextual information as children learn to read. *Read. Res. Quart.* 6:75-96, 1970.  
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First-graders move through three periods while learning to read: focus on contextual information, focus on graphic information, and a final period in which both are used. The earlier the shift from contextual to graphic information occurs, the higher the achievement at the end of the year. [The *Social Sciences Citation Index*® (SSCI)® indicates that this paper was cited over 100 times, making it the most-cited paper published in this journal.]

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As a graduate research assistant at Project Literacy at Cornell in the 1960s, I was assigned the job of designing a system for studying first-graders learning to read in the classroom. Our research group had been impressed by Ken Goodman's ideas about the use of oral reading errors to study children's strategies for word identification. Goodman suggested that errors could be used to determine children's relative use of graphic and contextual information to identify words.<sup>1</sup> For example, if a child said "shot" for the printed word "ship," the error indicates use of graphic information. If a child said "boat" for the word "ship," the error indicates use of contextual information. Goodman reported that able readers made fewer graphic errors and more contextual errors than poor readers. Consequently, one of the methods I included in my system was a weekly recording of each child's oral reading during classroom instruction.

In reviewing the data obtained through early November 1966, I was greatly sur-

prised to find, contrary to the Goodman context hypothesis, that the most able readers were making the most "nonresponse errors" (i.e., simply stopping when they encountered a word they didn't know), while the poorest readers were making predominantly contextual errors.

On the basis of these findings, I concluded that the nonresponse errors actually indicated attention to graphic information, i.e., realizing that a word must be supplied for each word on the page, and that if you don't know what that word is, you have nothing to say. I further hypothesized that we would see continued growth reflected first by increased graphic errors and later by an increase in errors that reflected use of both graphic and contextual information. This is what in fact occurred.

These findings indicated that able first-graders were mastering graphic skills *before* their less able peers. Additional research with these and other children supported the conclusion that able children had mastered both graphic and contextual skills to a greater degree than their less able peers.<sup>2</sup>

The debate between "meaning" (contextual) emphasis and "code" emphasis (using graphic strategies) has continued to the present day, and this may account for the continuing interest in my study. My own research has focused on other measures of effectiveness in using graphic information.<sup>3</sup> Currently, I am examining similar maturational variables in writing.

The majority of reading-process researchers now subscribe to some variant of the "interactive-compensatory" theory. Articulated by Stanovich, this theory recognizes that able readers are more capable than poor readers at using *both* types of information and suggests that instructional approaches that downplay the acquisition of skills for using graphic information place the child at a disadvantage.<sup>4,5</sup>

1. Goodman K. A linguistic study of cues and miscues in reading. *Elem. Engl.* 42:369-43, 1965. (Cited 85 times.)
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3. -----, Relationships between oral reading rates for letters, words, and simple text in the development of reading achievement. *Read. Res. Quart.* 13:223-53, 1977-1978.
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5. Stanovich K, Cunningham A E & Feeman D J. Relation between early reading acquisition and word decoding with and without context: a longitudinal study of first grade children. *J. Educ. Psychol.* 76:668-77, 1984.