



Reading comprehension development in at-risk vs. not at-risk first grade readers: The differential roles of listening comprehension, decoding, and fluency[☆]

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ARTICLE INFO

Keywords:

Reading comprehension
Listening comprehension
Decoding
Fluency

ABSTRACT

This study examined the relations between and predictive power of three important subcomponent skills of reading comprehension: decoding, listening comprehension, and reading fluency. Through a series of structural equation models, we examine the relations within a full sample of first grade students at the beginning of the year ($N = 290$). Next, we conducted analyses to determine if differential relations exist between the variables in students who are identified as at-risk for reading failure, and potentially reading disability ($n = 141$) and those who are not ($n = 149$). Results indicate that in early first grade, the relations between the subcomponent skills are different dependent upon risk status. For the full sample, fluency was the strongest predictor of reading comprehension, followed by decoding and listening comprehension. When the sample was split based on early reading skills at the beginning of first grade, for the not at-risk students, fluency, decoding, and listening comprehension each made individual contributions to reading comprehension. For the at-risk students, decoding was only significantly related to reading comprehension via fluency; listening comprehension did not significantly predict reading comprehension for this subsample. The findings are discussed and related to implications for the development and implementation of early reading interventions for students who are identified as having reading difficulties and potentially reading disability.

1. Introduction

Reading comprehension is the ability to make meaning from written, connected text; it is a multidimensional process, that is intentional and interactive, and requires precise performance of several underlying subcomponent skills. Understanding the development of these underlying subcomponent skills is essential to meet the instructional needs for all students learning to read. This is, arguably, most important for students who struggle with reading and reading related skills in the early grades, and may be at-risk of reading disability (RD). Students who do not receive adequate early reading intervention, targeted to their individual needs, tend to have persistent reading difficulties over the course of their school careers (Francis, Shaywitz, Stuebing, Shaywitz, & Fletcher, 1996; Juel & Leavell, 1988; Torgesen & Burgess, 1998). In order to develop and implement appropriate early reading interventions that target later reading comprehension, it is

important to investigate specific subcomponent skills in early readers, with the goal of determining how these skills develop in readers who, during the early elementary years, appear to be at risk for RD.

While the field is well informed on the development of reading comprehension in typically developing populations, somewhat less attention has been paid to the differential development of students who show signs of early risk in both decoding and comprehension. Evidence from previous studies suggests that early reading development for students who struggle and those diagnosed with reading disability does not follow the same pattern as typically developing readers. For example, often these students never attain the same level of reading skills as their peers (e.g., Francis et al., 1996; Pennington & Lefly, 2001; Scarborough, 1998; Snowling, Muter, & Carroll, 2007; Stanovich, 1986) demonstrating that development does not simply occur at a slower pace, but rather on an atypical trajectory. Slower speech and language development associated with broader language difficulties, early

[☆] This research was supported by the Institute of Education Sciences, U.S. Department of Education, through grant R324A150091 to the Regents of the University of California. The content is solely the responsibility of the authors and does not necessarily represent the official views of the Institute of Education Sciences or the U.S. Department of Education.

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<https://doi.org/10.1016/j.lindif.2018.06.005>

Received 1 June 2017; Received in revised form 29 March 2018; Accepted 6 June 2018
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deficits in phonological awareness, and familial risk for reading disability often characterize struggling readers (Catts, Hogan, & Adlof, 2005; Gallagher, Frith, & Snowling, 2000; Pennington & Olson, 2005; Preston et al., 2010; Scarborough, 1990). Few studies have empirically tested differential relations between early reading predictors in young at-risk readers as compared to their peers who do not demonstrate a profile of reading risk.

1.1. Reading comprehension development

Gough and Tunmer's (1986) influential model, the Simple View of Reading (SVR), postulates that successful reading comprehension is a multiplicative model that includes two essential ingredients or sub-component skills: word decoding and oral or listening comprehension (often referred to as listening comprehension). Empirical data supports the notion that both decoding and listening comprehension account for a large amount of variance in reading comprehension (Catts et al., 2005; Chen & Vellutino, 1997; Cutting & Scarborough, 2006; Hoover & Gough, 1990; Joshi & Aaron, 2000; Tunmer & Chapman, 2012). There is also empirical evidence that the relation between these variables changes over time (Catts et al., 2005; Francis, Fletcher, Catts, & Tomblin, 2005; Gough, Hoover, & Peterson, 1996; Kendeou, van den Broek, White, & Lynch, 2009; Kershaw & Schatschneider, 2012; Vellutino, Tunmer, Jaccard, & Chen, 2007); specifically, in the early grades, word recognition skills are paramount in their contribution to reading comprehension, while in later grades the importance of listening comprehension increases. The role of reading fluency, or the rate and accuracy of reading words and connected words text (Adams, 1990), is not specifically delineated in the SVR, although recent empirical data suggests a significant relation between reading fluency and reading comprehension (Chard, Vaughn, & Tyler, 2002; Eason, Sabatini, Goldberg, Bruce, & Cutting, 2013; Fuchs, Fuchs, Hosp, & Jenkins, 2001; Fuchs, Fuchs, & Maxwell, 1988; Jenkins, Fuchs, Van Den Broek, Espin, & Deno, 2003; Kim & Wagner, 2015; NICHD, 2000; Silverman, Speece, Haring, & Ritchey, 2013).

Very few studies have compared the relations between these three subcomponent skills, those included in the SVR (decoding and listening comprehension) and reading fluency simultaneously in early readers who are developing reading skills at a typical rate and those who are identified as at-risk for RD. Catts, Petscher, Schatschneider, Bridges, and Mendoza (2009) examined the predictive validity of reading fluency measured in first and second grade with respect to third grade reading comprehension. Third grade reading fluency was used to group students as either poor readers or not. Results demonstrated that reading fluency's predictive validity increased over time, but there was greater improvement for students at lower levels than higher levels of reading fluency. While these results demonstrate the importance of early reading fluency skills for later reading comprehension, the study did not include decoding or listening comprehension, therefore the differential impact of all of these underlying subcomponent skills to reading comprehension could not be determined.

1.2. Early subcomponent skills development

1.2.1. Phonological awareness

Phonological awareness skills have been identified as a precursor to successful decoding (e.g. Roth, Speece, & Cooper, 2002; Storch & Whitehurst, 2002; Torgesen, Wagner, & Rashotte, 1999a; Vellutino, Fletcher, Snowling, & Scanlon, 2004; Vellutino et al., 2007; Wagner & Torgesen, 1987), and successful decoding is necessary for accurate reading fluency. That is, students must be able to decode individual words if they are to string them together in connected text. Thus, it is reasonable to posit, at least indirect relations between phonological awareness and reading fluency in terms of predicting reading comprehension. These skills are generally viewed as crucial during a child's early reading development. While phonological awareness is not

explicitly named in the SVR, it is controlled in this study to improve the accuracy of the coefficients depicting the relations between decoding, reading fluency, and reading comprehension.

1.2.2. Decoding

The relation between decoding and comprehension has been well established in the literature (Chen & Vellutino, 1997; Georgiou, Das, & Hayward, 2009; Hoover & Gough, 1990; Joshi & Aaron, 2000). Evidence suggests that decoding is an important precursor skill to successful reading fluency and reading comprehension. For instance, LaBerge and Samuels (1974) theorized difficulty with decoding led to an inordinate amount of mental resources being devoted to reading individual words, which impedes a child's ability to extract meaning from connected text. For this reason, it is often one of the targets of early reading intervention with struggling readers (Foorman, Francis, Fletcher, Schatschneider, & Mehta, 1998; Foorman, Francis, Shaywitz, Shaywitz, & Fletcher, 1997; Rashotte, MacPhee, & Torgesen, 2001). However, intervention that targets only word level skills, such as decoding, have not always transferred into improvements in reading comprehension, most likely because while decoding is essential for successful reading comprehension, it is not the only predictor. Therefore, improving word reading skills may not by itself improve comprehension abilities.

1.2.3. Oral language and listening comprehension

Through hierarchical regression and latent variable modeling, researchers have begun to examine reading comprehension models that expand upon including only word level skills. Most of this research has concentrated on modeling the influence of oral language or listening comprehension in tandem with word level decoding skills (Catts, Fey, Zhang, & Tomblin, 1999; Francis et al., 2005; Kershaw & Schatschneider, 2012; Storch & Whitehurst, 2002; Vellutino et al., 2007). Some studies have shown that reading comprehension difficulties are the result of poor oral language or listening comprehension (Cain, Oakhill, Barnes, & Bryant, 2001; Hulme, Nash, Gooch, Lervåg, & Snowling, 2015; Nation, Adams, Bowyer-Crane, & Snowling, 1999; Nation & Snowling, 1998, 1999, 2000). There is also emerging evidence that intervening with these skills early in a child's reading development can significantly improve reading comprehension (Bowyer-Crane et al., 2008; Clarke, Snowling, Truelove, & Hulme, 2010). While the SVR theorizes decoding predominates listening comprehension in the early grades, it clearly makes a key contribution to reading comprehension as readers develop.

1.2.4. Fluency

Reading fluency is an individual's ability to read text with speed and accuracy (Adams, 1990); it has been described as the "bridge" between word decoding and reading comprehension (Pikulski & Chard, 2005). From a theoretical perspective, the importance of reading fluency surfaces when considering the cognitive demand of comprehension of written text. When individuals are first learning how to read, many of their cognitive resources are utilized decoding individual words. As they become more skilled readers, and words are automatically recognized, word reading becomes more fluent, allowing more cognitive resources to be applied to the task of comprehending connected text (LaBerge & Samuels, 1974; Perfetti, 1985). Converging empirical evidence exists to show the important relation between reading fluency and reading comprehension (Chard et al., 2002; Fuchs et al., 1988, 2001; Jenkins et al., 2003; Kim, Petscher, Schatschneider, & Foorman, 2010; Kim, Wagner, & Foster, 2011; NICHD, 2000; Riedel, 2007; Silverman et al., 2013).

In an expansion of the SVR, the Componential Model, Joshi and Aaron (2000) proposed adding fluency to help better describe the essential ingredients in reading comprehension. However, the componential model does not specify reading fluency, instead empirical support for the model utilized speed of processing in the form of letter

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