

---

# MULTISYLLABIC WORD-READING INSTRUCTION WITH AND WITHOUT MOTIVATIONAL BELIEFS TRAINING FOR STRUGGLING READERS IN THE UPPER ELEMENTARY GRADES

---

## *A Pilot Investigation*

### ABSTRACT

This randomized controlled trial focused on 59 struggling readers in the third and fourth grades (30 female, 29 male) and examined the efficacy of an intervention aimed at increasing students' multisyllabic word reading (MWR). The study also explored the relative effects of an embedded motivational beliefs (MB) training component. Struggling readers were randomly assigned to 1 of 3 groups: MWR only, MWR with an MB component (MWR + MB), or business-as-usual control. Students were tutored in small groups in 24 sessions, three 40-minute lessons each week. Students in both MWR groups outperformed the control group on measures of word-reading fluency. MWR + MB students outperformed MWR only on sentence-level comprehension and outperformed the control group in ratings of attributions for success in reading. Findings are discussed in terms of their relevance to MWR instruction for students with persistent reading difficulties and the potential for enhancing intervention through targeting motivation.

Jessica R. Toste  
Philip Capin  
Sharon Vaughn  
UNIVERSITY OF  
TEXAS AT AUSTIN

Garrett J. Roberts  
UNIVERSITY OF DENVER

Devin M. Kearns  
UNIVERSITY OF  
CONNECTICUT

**R**ESearch conducted over the last 3 decades provides substantial knowledge about early intervention practices for students at risk for reading difficulties in kindergarten through third grade (Fletcher, Lyon, Fuchs, & Barnes, 2007; Mathes et al., 2005; Torgesen et al., 1999; Vellutino et al., 1996). This research indicates that early elementary students make the strongest gains when explicit, systematic instruction in foundational reading skills is included with higher level reading tasks, such as fluency and reading comprehension (National Reading Panel, 2000). Despite considerable knowledge about the active ingredients of effective early reading instruction, there remain a significant number of students who continue to struggle with word reading beyond the primary grades (O'Connor & Fuchs, 2013; Torgesen, 1998, 2000). According to the most recent report by the National Assessment of Educational Progress (2015), only 36% of fourth graders perform at or above the proficiency level, suggesting that current instructional practices do not meet the needs of all students.

Research suggests that poor decoding skills are the primary challenge of struggling readers in the elementary grades (Leach, Scarborough, & Rescorla, 2003; Shankweiler, 1999; Yuill & Oakhill, 1991). With a decreased emphasis in word-reading instruction in the upper elementary grades, nonproficient word readers may face serious academic challenges. In fact, research indicates that students who struggle to read in third grade are likely to continue to struggle through high school (Brasseur-Hock, Hock, Kieffer, Biancarosa, & Deshler, 2011; Francis, Shaywitz, Stuebing, Shaywitz, & Fletcher, 1996; Moats, 1999; Vaughn et al., 2003) and are at higher risk to drop out of school (Dynarski et al., 2008). It is therefore necessary to identify effective interventions for students in the upper elementary years, before students enter secondary grades and are faced with additional social and academic challenges.

Students with a word-reading deficit will likely require instruction in this skill area to build a strong foundation for them to benefit from other forms of reading instruction. The simple view of reading (Gough & Tunmer, 1986), which posits that reading comprehension is a product of decoding and linguistic comprehension, provides theoretical support for the notion that reading comprehension performance of struggling decoders may not be maximized without attention to word-reading skills. Moreover, research has reported that multicomponent interventions have a greater effect on reading comprehension for students in upper elementary (Wanzek, Wexler, Vaughn, & Ciullo, 2010) and secondary grades (Kamil et al., 2008; Scamacca et al., 2007; Torgesen et al., 2007) than interventions focused on just one component of reading. In light of the importance of proficient word reading, it is problematic that many reading interventions aimed toward struggling readers in the upper elementary grades fail to adequately address word reading—and the need for continued instruction beyond early decoding skills. Identifying best practices in multisyllabic word reading (MWR) instruction would allow for integration within multicomponent interventions that aim to enhance the overall reading performance of struggling upper elementary readers. This study aims to investigate the efficacy of an MWR intervention that, if found to be effective, may constitute an important element in future multicomponent interventions.

Furthermore, we have yet to fully explore the potential of targeting other factors that are known to influence student performance, such as motivation. There is evidence that students' intrinsic motivation generally begins to decrease dramatically

into the middle elementary grades through middle school (Gottfried, 1985; Gottfried, Fleming, & Gottfried, 2001; Guthrie & Wigfield, 2000). However, there is evidence that reading skills and motivation are highly associated, and that there may be a bidirectional relationship between the two. That is to say, the constructs causally influence one another—students lose motivation because of repeated failure in acquiring reading skills; in addition, low motivation makes it less likely that they will engage in reading practice and increase performance (e.g., Chapman, Tunmer, & Prochnow, 2000; Morgan & Fuchs, 2007).

Thus, the question remains: What word-reading instructional practices are needed to assist students who have reading difficulties that have persisted into the upper elementary grades? This first purpose of this study was to examine the efficacy of an intervention aimed at increasing students' MWR to help inform future multi-component interventions for students in the upper elementary grades. The second purpose was to determine the relative effects of an embedded motivational beliefs (MB) training component. In the sections that follow, we describe the unique features of learning how to read multisyllabic words and how our intervention extends prior work. We then provide a rationale for motivational beliefs training and how motivation may enhance student learning.

## Multisyllabic Word Reading

There is extensive research to support the use of decoding (see research syntheses conducted by Scammacca, Roberts, Vaughn, & Stuebing, 2015; Wanzek & Vaughn, 2007; Wanzek et al., 2016) and morphological interventions (see Goodwin & Ahn, 2013) to improve the word-reading skills of students in the primary grades. MWR instruction, which typically includes elements of morphological instruction, is an area of decoding instruction that may be particularly important for older struggling readers who face texts with a higher proportion of multisyllabic words (Hiebert, Martin, & Menon, 2005; Nagy & Anderson, 1984). Despite substantial research on decoding and morphological awareness interventions, few high-quality studies have examined the specific effects of MWR practices for students with reading difficulties (Bhattacharya & Ehri, 2004; Diliberto, Beattie, Flowers, & Algozzine, 2009; Lenz & Hughes, 1990; Shefelbine, 1990).

Older students who struggle with word-level reading skills can generally decode single-syllable words and recognize some high-frequency words but experience difficulty when faced with multisyllabic words (Just & Carpenter, 1987; Perfetti, 1986). For example, Shefelbine and Calhoun (1991) found that advanced readers use morphological knowledge and accurate letter-sound associations to read unfamiliar multisyllabic words, but poor readers focus on letter units and partial syllables. Similarly, others have reported that adept readers see words in morphological parts, whereas struggling readers rely on contextual clues and pictures to identify unknown words (Archer, Gleason, & Vachon, 2003; Bhattacharya & Ehri, 2004). Acquiring successful access to MWR is necessary for students because the average student encounters 10,000 new words each year after fourth grade, and most of these words are two or more syllables (Kearns et al., 2015; Nagy & Anderson, 1984).

There is evidence that MWR instruction is effective in improving the word-reading skills of struggling readers (Bhattacharya & Ehri, 2004; Diliberto et al.,

2009; Lenz & Hughes, 1990; Shefelbine, 1990). Struggling readers in grades 4 and 6 that received a multisyllabic intervention showed significant improvements in word reading on standardized measures of word identification (Shefelbine, 1990). In an experimental study conducted by Bhattacharya and Ehri (2004), struggling readers in grades 6 to 10 assigned to a syllable training condition outperformed students in treated and untreated comparison conditions on proximal and transfer measures of word reading and spelling. Two additional studies with middle school readers at risk for reading failure found superior performance from students who received syllabication instruction on measures of word reading and on researcher-generated (Lenz & Hughes, 1990) and standardized measures of reading comprehension (Diliberto et al., 2009). Each of these multisyllabic reading interventions involved teaching students syllabication rules and providing students with opportunities to practice dividing multisyllabic words into parts to improve word reading. The specific strategies included dividing syllables based on the identification of vowel nuclei (Bhattacharya & Ehri, 2004), affixes and Latin roots (Shefelbine, 1990), or a combination of several syllable division strategies (Diliberto et al., 2009; Lenz & Hughes, 1990).

Despite promising findings in the multisyllabic studies reviewed, recent research reveals promising directions for MWR instruction. To date, MWR instruction has focused on teaching students phonics-based strategies and rules, but recent research has found that knowledge of these rules does not predict students' accuracy in reading multisyllabic words (Kearns, 2015). In addition, many struggling readers have deficits in phonological memory (Shankweiler, Crain, Brady, & Macaruso, 1992; Wagner & Torgesen, 1987), which may make it difficult for them to simultaneously process morphologically complex words and recall appropriate strategies. Ultimately, successful reading comprehension will rely on students exerting less attention when processing and reading words so they can dedicate more attention to understanding read texts. This would suggest that less cognitively demanding approaches to teaching MWR, especially when combined with other reading practices within a broader reading intervention, may enhance reading comprehension. Research suggests that students acquire word representations through the application of context-sensitive decoding rules (e.g., moving beyond one-to-one correspondence to making implicit connections between orthographic and phonological word units) and repeated exposure (Cunningham & Stanovich, 1991; Perfetti, 1992; Stanovich, 1996). To investigate an alternative to the rule-based instruction previously researched, we conducted an experimental study to examine the effects of an MWR intervention aimed at providing students repeated exposures to multisyllabic words in isolation and in context. The intervention employed in this study differs from past multisyllabic interventions in three ways: (a) Students were not explicitly taught syllabication rules, (b) students were provided extended opportunities to practice reading multisyllabic words in isolation and in context, and (c) students also had numerous timed practice opportunities to improve rate of MWR.

## Motivational Beliefs

Accumulating evidence indicates that the effectiveness of a particular instructional practice may depend on the student characteristics and that these individual dif-

ferences among students play both independent and interactive roles in explaining reading development (e.g., Compton et al., 2010; Connor, Morrison, Fishman, Schatschneider, & Underwood, 2007). In recent years, there has been more interest in understanding the role of factors such as motivation and its influence on students' educational outcomes (M. T. Wang & Degol, 2014). Previous research has provided evidence from correlational, cross-sectional, and longitudinal studies to support the relations between reading and motivation (e.g., Baker & Wigfield, 1999; Becker, McElvany, & Kortenbruck, 2010; Logan & Medford, 2011; Logan, Medford, & Hughes, 2011; Morgan & Fuchs, 2007; Taboada, Tonks, Wigfield, & Guthrie, 2009; J. H. Y. Wang & Guthrie, 2004).

Struggling readers, by definition, have had more experiences of failure or strain with reading tasks. Although we know far less about the development of motivational processes than we do reading skills, there is strong evidence that less skilled readers have more negative motivational beliefs than their peers. For example, Chapman and Tunmer (1997) noted the association between reading performance and self-concept increasing dramatically from the first through second year of school—and that self-concept is relatively unstable over these first 2 years of school. Students have a range of experiences (both successes and struggles) when first learning how to read, so it would seem logical that students' patterns of performance in reading “take a few years to develop, with achievement-related self-perceptions taking longer to stabilize and reflect the emerging patterns of achievement” (Chapman et al., 2000, p. 704). Moving into the upper elementary grades, we continue to observe a consistent relationship between reading achievement and motivation. Logan et al. (2011) examined motivation as a predictor of reading comprehension skill among high- and low-ability elementary-aged readers. Findings revealed that motivation and decoding skill explained significant variance in reading comprehension skill for poor readers, but not in the group of good readers.

Researchers generally believe that motivation supports cognitive ability rather than operates independently from it (Schunk & Zimmerman, 2012). For example, highly motivated students demonstrate increased effort, perseverance, help seeking (e.g., asking questions or seeking assistance), and active engagement (Vansteenkiste, Lens, & Deci, 2006); show continued persistence in the face of obstacles and adversity (Multon, Brown, & Lent, 1991; Schunk, 1991); and spend more time reading outside of school than their peers (Wigfield & Guthrie, 1997). The skills supported by motivation enhance the likelihood of successful learning experiences. As such, we are particularly interested in exploring the potential of targeting motivation as a method of supporting student performance within a reading intervention.

### Interventions Targeting Motivation

More than a decade ago, Pintrich (2003) asserted that “researchers interested in basic questions about how and why some students seem to learn and thrive in school contexts, while other students seem to struggle to develop the knowledge and cognitive resources to be successful academically, must consider the role of motivation” (p. 667). Several studies to date have included motivation as a key component of a reading intervention. In a study conducted by Toland and Boyle (2008), the authors sought to change the ways that children explained their lack of achievement to themselves—and they examined academic outcomes as a consequence

of participation in this intervention. Children identified as having low self-esteem participated in group sessions and were provided with modeling of positive thinking about learning. Findings indicated that students in the intervention placed increased effort on tasks, with associated improvement in the areas of reading and spelling. To date, we have only a handful of studies aimed at promoting motivation within reading interventions. For example, in Concept-Oriented Reading Instruction (CORI; Guthrie, McRae, & Klauda, 2007; Swan, 2003), specific instructional dialogue based in motivational theory has been embedded in daily practices, with resulting increases in students' intrinsic motivation for reading. Guthrie and colleagues (2004) supported third-grade teachers in using the CORI model for 12 weeks. Across two studies, the authors reported that students in CORI classrooms outperformed students who received strategy instruction or traditional instruction on measures of reading comprehension, use of strategies, and motivations for reading. Berkeley, Mastropieri, and Scruggs (2011) embedded a modeling and self-talk approach to attribution retraining (AR) in a reading-comprehension strategy intervention for adolescents with learning disabilities. The authors reported an increased use of strategies by the participants and noted that only the AR group maintained these gains after a 6-week delay. These findings support the assertion that when students achieve success counter to their expectations, their beliefs about their potential may shift. This enhances students' investment in academic tasks, thus promoting academic achievement (Cohen, Nienow, Dinzeo, & Docherty, 2009).

### **Purpose of the Current Study**

Upper elementary students often struggle to accurately decode texts as they are faced with an increasing number of multisyllabic words (Just & Carpenter, 1987; Perfetti, 1986). For these students, intensive MWR instruction may be an essential component of an effective reading intervention. This study extends the research investigating the benefits of MWR interventions for struggling readers beyond the primary grades (i.e., third grade and up), differing from past reading interventions in two ways. First, no previous study has measured the effects of a multisyllabic reading intervention on improving multisyllabic reading automaticity through high levels of practice both in isolation and in context. Second, this study aimed to evaluate the differential effect of a reading intervention with and without a motivational beliefs training component. Sustaining and improving motivation is particularly important for students in third and fourth grade, given the finding that many students experience reading difficulties as texts become increasingly difficult in these grades (Chall & Jacobs, 2003). Students that received the motivational beliefs component were taught how to make connections between positive thoughts and success as well as to attribute their successes and struggles to controllable factors.

The purpose of this study was to test the efficacy of an intervention aimed at increasing the MWR fluency of upper elementary students and explore the potential of integrating motivational beliefs training within a reading intervention. A three-condition design was employed: MWR only, MWR with a motivational beliefs component (MWR + MB), and a business-as-usual comparison condition. Two research questions were addressed:

1. What are the effects of treatment (MWR) compared with a control group on measures of reading performance?
2. What are the effects of the MWR + MB intervention compared with MWR only on measures of reading and motivation?

## Method

### Participants

The research was conducted in elementary schools in a large urban city in the southwestern United States. Third- and fourth-grade students were recruited from two charter schools, with approximately half of the sample from each site, to participate in this study. While we would consider upper elementary students to include third through fifth grades, one of our sites was a new charter school growing one grade level each year and had not yet enrolled fifth graders. Both school sites were similar demographically, with 86.5% of students at School 1 and 51% of students at School 2 qualifying for free and reduced-price lunch. The ethnic representation across School 1 is majority Hispanic (95%), White (2.5%), Black (1.5%), and Asian (1%). The distribution differed slightly at School 2, but the majority of students were Hispanic (68.5%), White (15%), Black (11.5%), and Other (5%).

Teachers were asked to nominate their lowest performing readers, based on assessment and progress monitoring data collected as standard practice. Ninety-eight students were nominated and screened using the Test of Word Reading Efficiency—Second Edition (TOWRE-2; Torgesen, Wagner, & Rashotte, 2012). Students were included in the study if they scored below the 37th percentile on one of the two TOWRE-2 subtests. This percentile is only marginally above the bottom third of students, and a more liberal cutoff is often considered when identifying students for instructional support (e.g., Tier 2) rather than qualification for special education services. The authors of the TOWRE have suggested that the 39th percentile be used as a cutoff score when assessing reading difficulties for instructional purposes (Torgesen & Hayes, 2003).

After screening, 34 students were excluded from the sample as they did not meet criteria, and an additional five students did not participate because of scheduling conflicts (e.g., additional school services) or relocation before the study began. The study included a final sample of 59 students (30 female, 29 male), with 39 third graders and 20 fourth graders. Randomization was blocked on grade, and students were assigned to one of three conditions: MWR only ( $n = 18$ ), MWR + MB ( $n = 19$ ), and control ( $n = 22$ ). There were no significant pretreatment differences between grades or treatment groups on any measures of reading performance or student motivation. Attrition was minimal, with only one student from the control group withdrawing during the course of the intervention because of relocation.

### Measures

Students were assessed on measures of word reading, text comprehension, and attributions pre- and postintervention. All measures were administered in schools, in quiet areas identified by staff, by members of the research team who were hired

and trained by an assessment coordinator and who were blind to whether students were in treatment or control conditions. Training for administering and collecting assessments was provided before the start of the study, and all assessment personnel were required to obtain an interrater reliability above .90 with the gold standard (Gwet, 2001). Pretesting for all students was conducted over the course of 2 weeks prior to the start of the intervention, and posttesting was conducted within the 2 weeks immediately following the end of the intervention.

**Word reading.** Word identification was measured with two untimed subtests of the Woodcock-Johnson III (WJ III NU; McGrew, Shrank, & Woodcock, 2007): Letter-word identification measures skill in reading words in isolation, and word attack assesses skill in using phonic and structural analysis to read nonsense words. Internal-consistency reliability exceeds .80 for each subtest. Word-reading fluency was measured with two timed subtests of the Test of Word Reading Efficiency—Second Edition (TOWRE-2; Torgesen et al., 2012). The sight word efficiency subtest assesses the number of real printed words that can be accurately identified within 45 seconds. The phonetic decoding efficiency subtest measures the number of pronounceable printed nonwords that can be accurately decoded within 45 seconds. Test–retest reliability ranges from .83 to .96, and alternative-form reliability exceeds .90. These tests include a combination of single-syllable and multisyllabic words.

**Text comprehension.** To assess text comprehension, the sentence comprehension subtest of the Wide Range Achievement Test—Fourth Edition (WRAT4; Wilkinson & Robertson, 2006) was administered. This measures the student's ability to gain meaning from words and to comprehend information in short passages using a modified cloze technique. The format of this test is similar to other commonly used measures of reading comprehension, such as the passage comprehension subtest from the Woodcock-Johnson III (WJ III; McGrew et al., 2007). WRAT4 subtest test–retest coefficients range from .91 to .98, and correlations with other achievement tests range from .60 to .80 (Sattler & Hoge, 2006).

**Vocabulary.** A measure of reading vocabulary was administered at pretest only as we wished to examine whether students' vocabulary knowledge may serve as a potential moderator of intervention effects. The synonyms and antonyms subtests of the extended battery of the WJ III (McGrew et al., 2007) were administered to assess the ability to provide synonyms and antonyms in response to stimulus words presented orally. Split-half reliability is greater than .90 on the reading vocabulary subscale.

**Motivations.** Finally, we selected a measure clearly aligned with one theory of academic motivation, which asks about students' beliefs about their own performance as a reader and the task of reading. Attributions are the causal explanations for success and failure that students assign to the occurrences in their lives, which in turn influence their future behavior. External feedback has been suggested to increase students' understanding of an achievement situation as well as influence their response to that achievement (Weiner, 1986, 2000). We felt that attribution theory was well aligned with the MB training used in this study. Students completed the Reading Attribution Scale (RAS; Berkeley et al., 2011), an adapted version of a measure originally developed by Shell, Colvin, and Bruning (1995). The



RAS consists of a total of 14 items that students respond to on a 5-point Likert scale from *never true* (1) to *always true* (5). There are seven pairs of questions, one for success (e.g., “When I understand what I read, it is because I am smart”) and one for failure (e.g., “When I don’t understand what I read, it is usually because I didn’t work hard”), related to seven variables. Three were internal variables (i.e., ability, effort, strategy use) and four were external variables (i.e., assistance from teacher, luck, interest, task difficulty). Subscale totals range from 14 to 35, with higher scores (>21) suggesting high attributions for internal variables and low attributions for external variables and lower scores (<21) indicating low attributions for internal variables and high attributions for external variables (Berkeley et al., 2011). For the present sample, Cronbach’s alpha levels were calculated at pretest and demonstrated acceptable internal consistency for both the attributions for success (.64) and attributions for failure (.82) subtests.

### Intervention Overview

Tutoring was conducted in small groups of two or three students during the school day, in locations designated by administration (e.g., unused classroom, library, lunch room). There is substantial evidence that small-group reading interventions achieve comparable outcomes to one-to-one interventions (see Elbaum, Vaughn, Tejero Hughes, & Watson Moody, 2000), and this format has the benefit of being able to provide tutoring to a larger number of students. Following randomization, students were grouped within school and grade level (e.g., a group would include only third graders from School 1, or only fourth graders from School 2) for scheduling purposes.

Tutoring sessions focused on either MWR instruction only or MWR + MB training. All lessons were fully scripted to ensure standardization across all tutoring groups. Tutors met with groups 3 times each week for 8 consecutive weeks, totaling 24 lessons. Each instructional lesson was 40 minutes. This included 35 minutes of MWR instruction. The embedded training in the MWR + MB condition added approximately 5 minutes to each lesson. To equate the number of minutes the two treatment conditions spent in small-group instruction, the students in the MWR-only condition completed 5 minutes of math fact fluency practice at the end of each lesson. This ensured that they received the same amount of small-group time but also did not advantage the MWR-only condition by simply providing 5 extra minutes of reading practice.

**MWR instruction.** Students in both treatment conditions, MWR only and MWR + MB, were exposed to the same reading instruction. Each lesson consisted of seven instructional components. First, each lesson began with “Warm-Up” (2 minutes), wherein students practiced reading skills that were prerequisite to success with multisyllabic words. Specifically, students were introduced to a target vowel pattern in each lesson (e.g., short vowels, vowel digraphs, diphthongs, *r*-controlled vowels), reading the pattern in isolation and in nonsense words. Next, students reviewed their “Affix Bank” (3 minutes). The tutors would explicitly introduce new affixes, provide a sample word, and direct student to write the prefix or suffix in

their Affix Bank folder. Affixes were selected from a list of the most commonly used prefixes and suffixes in third- through ninth-grade-level words (White, Sowell, & Yanagihara, 1989).

The core of each lesson included time where students were exposed to meaningful linguistic units (i.e., morphemes) through repeated practice, blending and segmenting word parts, and exposure to a large number of words. During “Word Play” (5 minutes), students read the day’s five “spotlight words” (e.g., base words) and assembled/read word parts for automaticity (e.g., dis + grace + ful). We alternated among four games to keep students engaged while maintaining the goal of the activity. Students then practiced breaking apart word parts during “Beat the Clock” (5 minutes). From a list of 24 multisyllabic words, we (a) circled affixes, (b) chorally read affixes, and (c) chorally read whole words. Each student then completed a timed reading of the words, followed by a second read where they tried to beat their first time. The multisyllabic words selected for both the Word Play and Beat the Clock activities were aligned with the affixes taught in previous lessons and often included spotlight words as their base, thus increasing the number of exposures to various word units. Next, we guided students through encoding practice during “Write Word” (7 minutes). Students wrote words with two or more syllables by building onto a given affix. It is important to note that instruction did not highlight the definitions or meanings of these prefixes or suffixes but rather the implicit connections between word units to support the fluent reading of multisyllabic words.

The fifth component was “Speedy Read” (5 minutes), which provided students with repeated exposures to a large bank of high-frequency words. Each day, students completed repeated readings of a list of 40 words—the majority of these words were multisyllabic, but early lessons also included words with target patterns (e.g., digraphs or vowel blends). The words were read aloud as a group. Next, students completed a timed independent reading to see how many they could read in 30 seconds. Finally, during “Text Reading” (8 minutes), students completed repeated readings of connected text. We first introduced key words for the day’s text, providing a student-friendly definition and highlighting the word in the passage. We then completed repeated readings of third-grade-level QuickReads passages (Hiebert, 2003). Each passage of approximately 150 to 200 words was slightly modified by our team to include a larger number of multisyllabic words. We included three to five additional multisyllabic words per passage, building from the affixes students had seen in previous lessons, with minor revision to ensure syntactic accuracy of the sentences.

**Motivational beliefs training.** In the MWR + MB, the added motivation training was embedded throughout the lesson. The study of motivational processes has evolved from several research traditions and, as such, an array of theory-driven constructs has been investigated. Although each of these constructs may differ slightly in definition, they are all framed around this central premise that intrinsic motivation results in increased engagement and achievement (Schutz & Pekrun, 2007). As such, the goal of our MB training was to enhance intrinsic motivation, operationalized as students’ beliefs about self and reading, through self-reflection, positive self-talk, and recognition of negative statements. Each lesson began by asking students to think about their current readiness on a scale from 1 to 5 using our “check-in” poster. Throughout the 24 lessons, tutor modeling guided students

in using positive self-talk and generated self-motivated statements to support their efforts while reading. We also incorporated scenarios such as the following:

We are going to use our positive thoughts to help us work hard today. To practice, I'm going to tell you a story about another student, and I want you to think of examples of how to turn this student's negative thoughts to positive ones. Marco is in the fourth grade. He reads books to his younger brother all the time, but he doesn't think he is a good reader. When it's time to take a test in class, he gets mad when he doesn't know an answer. Marco just wishes tests were never invented! Now, who can help Marco be successful by giving him some examples of positive thoughts? [Students will provide examples of positive thought statements.] Who can tell me why these positive thoughts will help Marco?

Through these types of scenarios, students were asked to identify the negative thoughts that a student (usually a struggling reader in the upper elementary grades) may be having, and then help that student generate positive self-talk to support his or her learning. As students became comfortable with this process, we discussed real academic situations wherein they had experienced difficulty, the types of thoughts they may have had during that situation, and how they could recognize and change negative thoughts when they arise in the future.

**Tutors.** Five tutors were hired and trained to deliver the intervention. All tutors were female and had at least an undergraduate level of education. Three of the tutors were certified in elementary and/or special education; the remaining two tutors had extensive experience working with students and had been employed with our research team as test administrators on previous projects. The tutors completed a "mock" implementation of a lesson with one of the project coordinators and had to achieve at least 90% adherence to protocols before tutoring began.

**Implementation fidelity.** Each tutor had at least four sessions where fidelity was assessed by project coordinators: two live observations and two recorded checks. Tutors' implementation fidelity was scored on two parts: (a) qualitative rating that scored tutors as highly effective, somewhat effective, or ineffective on instructional elements such as pacing, use of correction procedures, and management of student behavior; and (b) individual activity rankings on a 52-item checklist that detailed all intervention components and instructional routines. Checklist items were marked as performed correctly, performed incorrectly, or not observed, and these items were broken down by general tutoring behaviors (e.g., "Tutor follows lesson scripts"), each intervention component (e.g., for Affix Bank, "Tutor provides sample words and prompts students to generate words," or for Beat the Clock, "Tutor prompts students to circle affixes on their BTC word list"), and closure (e.g., "Tutor provides specific praise about each student's performance"). Scores were calculated by dividing the number of items conducted correctly by the total number of items observed. Fidelity ranged from 84% to 100%, with a mean of 95.15% ( $SD = 4.42$ ) across all sessions.

**Control group.** Fifty-nine participating students were randomly assigned to one of three conditions: two treatment groups (MWR only and MWR + MB) or the business-as-usual control group. All students in the study received the same core reading instruction. Students in the treatment groups received supplemental read-

ing intervention delivered by our trained research staff, as described above. The principal investigator met with the third- and fourth-grade teachers at both schools to obtain information about the instruction received by the students in the control group while students in the treatment conditions received reading intervention. Instruction during this time varied throughout the year, but teachers provided primarily small-group instruction that included practice such as guided reading, silent reading, and computer-based programming and preparation sessions for the State of Texas Assessments of Academic Readiness.

### Statistical Analysis

To estimate treatment effects, we fit a series of regression models in *Mplus 7.2* (Muthén & Muthén, 2014). Pretest scores were grand-mean centered (Enders & Tofghi, 2007) and included as a covariate. Family-wise error associated with multiple comparisons was controlled using the Benjamini-Hochberg correction (Benjamini & Hochberg, 1995), and effect sizes were estimated as the ratio between the model-derived treatment coefficients and the pooled within-group standard deviation across conditions at posttest. To account for differences between schools, we added a dummy-coded variable to the model. No differences between schools were found on any of the outcome measures of interest; as such, we report the findings for the most parsimonious model.

### Results

Two regression models aligned with our research questions were run. There were no significant pretest group differences on any of the study measures. First, to examine the effect of the reading intervention on student performance, we first compared the combined treatment group (MWR only and MWR + MB) to the control group on reading outcomes. Pretest and posttest means and standard deviations for the two groups are shown in Table 1. We found that students who received the reading intervention significantly outperformed students in the control condition on TOWRE-2 sight word efficiency ( $\beta = 5.04, p = .00, g = .73$ ). Although there were no statistically significant differences on the other reading outcomes, moderate effect sizes were noted on the phonemic decoding subtest ( $g = .31$ ), letter-word identification ( $g = .29$ ), and word attack ( $g = .30$ ). Regression results are shown in Table 2.

Next, we were interested in examining potential differences between students who received the reading intervention with and without the targeted motivational beliefs training. As such, we ran comparisons among the three groups on reading and performance attributions: MWR only versus control, MWR + MB versus control, and MWR + MB versus MWR only. Pretest and posttest means and standard deviations for the three groups are shown in Table 3. Regression results, shown in Table 4, revealed that students in the MWR + MB group scored significantly higher than students in the MWR-only group ( $\beta = 5.54, p = .00, g = .61$ ) on the sentence comprehension subtest of the WRAT4. Both the MWR-only and MWR + MB groups independently outperformed control on sight word efficiency

Table 1. Means and Standard Deviations for Treatment and Control Groups

Measures	Pretest			Posttest		
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>
Sight word efficiency:						
Treatment	89.78	5.63	37	92.32	6.87	37
Control	88.59	4.88	22	86.81	6.70	21
Phonemic decoding efficiency:						
Treatment	86.46	7.99	37	92.49	10.08	37
Control	87.05	8.77	22	90.10	8.85	21
Letter-word identification:						
Treatment	97.08	4.88	37	96.57	5.20	37
Control	95.95	5.74	22	94.14	7.24	21
Word attack:						
Treatment	98.05	5.97	37	97.59	7.47	37
Control	97.18	5.78	22	95.19	5.48	21
Sentence comprehension:						
Treatment	96.57	10.13	37	98.86	9.05	37
Control	90.36	10.61	22	94.91	14.33	21

Note.—All reported means are standard scores from respective measures.

( $\beta = 5.74$ ,  $p = .01$ ,  $g = .78$ , and  $\beta = 4.59$ ,  $p = .01$ ,  $g = .75$ , respectively). We also examined students' ratings of performance attributions in this model and found that students in the MWR + MB group scored significantly higher than the control group on the RAS success subscale ( $\beta = 2.17$ ,  $p = .01$ ,  $g = .74$ ). These students had significantly higher attributions for internal variables (e.g., effort, ability, strategy use) and lower attributions for external variables. Although students in the MWR-only group did not score significantly higher than those in the control group on RAS success, a large effect size was noted ( $\beta = 1.78$ ,  $p = .06$ ,  $g = .60$ ).

Table 2. Fixed Effects for Treatment versus Control Groups

Predictor	Estimate	<i>T</i> Ratio <sup>a</sup>	<i>p</i> Value	<i>g</i>
Sight word efficiency:				
Intercept	87.11	63.69	.00	
Pretest	.47	2.76	.00	
Treatment <sup>a</sup>	5.04	2.93	.00	.73
Phonemic decoding:				
Intercept	89.72	76.87	.00	
Pretest	.81	9.23	.00	
Treatment <sup>a</sup>	2.98	1.75	.08	.31
Letter-word identification:				
Intercept	94.58	99.20	.00	
Pretest	.87	6.93	.00	
Treatment <sup>a</sup>	1.73	1.53	.13	.29
Word attack:				
Intercept	95.41	90.75	.00	
Pretest	.48	3.34	.00	
Treatment <sup>a</sup>	2.06	1.34	.18	.30
Sentence comprehension:				
Intercept	97.32	37.67	.00	
Pretest	.62	7.47	.00	
Treatment <sup>a</sup>	.12	.04	.97	.01

<sup>a</sup> Control is the reference group.

Table 3. Means and Standard Deviations for MWR Only, MWR + MB, and Control Groups

Measures	Pretest			Posttest		
	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>
Sight word efficiency:						
MWR	91.17	6.09	18	93.56	8.06	18
MWR + MB	88.47	4.96	19	91.16	5.49	19
Control	88.59	4.88	22	86.81	6.70	21
Phonemic decoding efficiency:						
MWR	85.72	9.80	18	93.06	12.54	18
MWR + MB	87.16	5.99	19	91.95	7.36	19
Control	87.05	8.77	22	90.10	8.85	21
Letter-word identification:						
MWR	97.33	4.95	18	97.00	3.85	18
MWR + MB	96.84	4.95	19	96.16	6.31	19
Control	95.95	5.74	22	94.14	7.24	21
Word attack:						
MWR	97.22	7.11	18	98.44	7.33	18
MWR + MB	98.84	4.71	19	96.79	7.71	19
Control	97.18	5.78	22	95.19	5.48	21
Sentence comprehension:						
MWR	98.33	10.60	18	97.17	7.90	18
MWR + MB	94.89	9.64	19	100.47	9.97	19
Control	90.36	10.61	22	94.91	14.33	21
Attributions for success:						
MWR	21.94	2.54	18	21.72	2.89	18
MWR + MB	22.11	3.20	19	22.26	2.81	19
Control	22.41	3.84	22	20.14	3.04	21
Attributions for failure:						
MWR	21.88	3.18	18	22.39	2.73	18
MWR + MB	21.95	2.72	19	21.42	2.43	19
Control	20.32	3.39	22	20.29	3.80	21

Finally, the possible interaction between vocabulary and treatment in predicting reading outcomes was assessed. Treatment effects did not interact with vocabulary on any of the reading outcome measures, indicating that students benefitted equally from participation in the intervention regardless of their entry-level vocabulary knowledge.

## Discussion

We conducted an experimental study of an MWR intervention for third- and fourth-grade students. We designed and implemented this intervention with two aims: (a) to test the effects of an MWR intervention on measures of reading performance for upper elementary students, and (b) to explore the effects of an MWR intervention, with and without a motivational beliefs training component, on measures of reading and motivation. To the best of our knowledge, this is the first randomized controlled trial that has examined the added value of targeting motivation within a word-reading intervention for elementary students. Findings from the current investigation show that both MWR groups outperformed controls on measures of word and nonword reading. Further, students in the MWR + MB group had greater gains on a measure of sentence-level reading comprehension

Table 4. Fixed Effects for Comparisons of MWR Only, MWR + MB, and Control Groups

Predictor	Estimate <sup>a</sup>	T Ratio <sup>a</sup>	p Value	g
Sight word efficiency:				
Intercept	87.56	59.11	.00	
Pretest	.42	2.67	.00	
MWR <sup>b</sup>	5.74	2.59	.01	.78
MWR + MB <sup>b</sup>	4.59	2.52	.01	.75
MWR + MB <sup>c</sup>	-1.15	-8.0	.43	-.17
Phonemic decoding:				
Intercept	88.84	69.47	.00	
Pretest	.81	9.35	.00	
MWR <sup>b</sup>	4.13	1.82	.07	.39
MWR + MB <sup>b</sup>	1.67	.91	.36	.20
MWR + MB <sup>c</sup>	-2.46	-1.01	.31	-.24
Letter-word identification:				
Intercept	94.58	99.15	.00	
Pretest	.87	6.88	.00	
MWR <sup>b</sup>	1.95	1.59	.11	.33
MWR + MB <sup>b</sup>	1.53	1.14	.25	.22
MWR + MB <sup>c</sup>	-0.42	-3.4	.73	-.08
Word attack:				
Intercept	95.42	90.59	.00	
Pretest	.50	3.47	.00	
MWR <sup>b</sup>	3.31	1.86	.06	.52
MWR + MB <sup>b</sup>	.85	.42	.67	.13
MWR + MB <sup>c</sup>	-2.46	-1.09	.28	-.33
Sentence comprehension:				
Intercept	97.43	37.73	.00	
Pretest	.65	7.32	.00	
MWR <sup>b</sup>	-2.91	-9.6	.34	-.24
MWR + MB <sup>b</sup>	2.63	.90	.37	.21
MWR + MB <sup>c</sup>	5.54	2.86	.00	.61
Attributions success:				
Intercept	20.09	29.96	.00	
Pretest	.30	2.37	.02	
MWR <sup>b</sup>	1.78	1.91	.06	.60
MWR + MB <sup>b</sup>	2.17	2.54	.01	.74
MWR + MB <sup>c</sup>	.39	.47	.64	.14
Attributions failure:				
Intercept	20.80	31.59	.00	
Pretest	.44	3.91	.00	
MWR <sup>b</sup>	1.45	1.57	.12	.43
MWR + MB <sup>b</sup>	.31	.37	.71	.10
MWR + MB <sup>c</sup>	-1.14	-1.41	.16	-.44

<sup>a</sup> Unstandardized regression coefficient.

<sup>b</sup> Control is the reference group.

<sup>c</sup> MWR-only is the reference group.

and higher attributions for reading success. As a pilot study, we feel that these findings provide promising support for future investigations.

### Multisyllabic Word Reading Instruction

Our findings indicate that students who received MWR instruction (with and without MB) had greater gains on a standardized measure of word-reading fluency than did students in the control condition. Although the MWR group did not sig-

nificantly outperform the control group on our other measures, effect sizes on the TOWRE-2 phonemic decoding subtest ( $g = .31$ ), letter-word identification ( $g = .31$ ), and word attack ( $g = .31$ ) subtests of the WJ III were moderate. These effect sizes are notable for educational intervention research with this age group (Lipsey et al., 2012), but further replication is required.

This study provides initial evidence to support a practice that may ultimately improve multicomponent reading interventions for upper elementary students with reading difficulties. This practice holds promise for providing students with a mechanism for word reading and achieving the ultimate goal of reading for understanding. The average number of syllables in the words that students read increases steadily throughout their school years (Kearns et al., 2015), and these are often content words that carry the meaning of the passage (Bryant, Ugel, Thompson, & Hamff, 1999). The goal of developing an MWR intervention for struggling readers in the upper elementary grades is to support students in becoming more accurate and efficient readers to free up cognitive resources and allow for greater attention on text comprehension.

Our critical evaluation of the literature related to MWR instruction indicates students' knowledge of phonics-based rules do not predict their MWR skills in the same way as they do early word-reading skills (Kearns, 2015), and word representations are best acquired through repeated exposure that allows for the application of specific phonics rules within the context of the words in which they appear. Because existing programs tend to focus on rules-based instruction to teach multisyllabic words, we designed and implemented an approach aligned with this more current research, providing explicit instruction that focused on building representations of meaningful linguistic units (i.e., morphemes) through repeated practice, blending and segmenting these word parts, and giving exposure to a large number of words. We posit that increased practice with fewer cognitive demands creates a situation where students are more likely to acquire knowledge of word units in a way that supports their ability to read multisyllabic words both accurately and fluently. The current findings provide initial evidence to support this approach to improving the word-reading skills of struggling readers in the upper elementary grades.

### Motivational Beliefs Training

We were also interested in differences between students who received the MWR intervention with and without a motivational beliefs training component. We found that students in the MWR + MB group significantly outperformed those in the MWR-only group on a measure of sentence-level text comprehension. Compared with the control group, students in the MWR + MB group also had higher scores on the attributions for success subscale, which indicates that they were more likely to attribute success to internal causes (e.g., effort) and not to external causes (e.g., luck). A possible explanation for these findings is that the MB training component of this intervention enhances students' feelings of competence and belief in their own abilities—increasing the likelihood that they will actively engage with instruction and demonstrate sustained effort on difficult tasks, which has the potential to improve reading performance. This hypothesis is supported by previous research



suggesting a possible causal link between motivational processes and academic outcomes. For example, it has been reported that high levels of motivation are positively associated with reading in studies investigating students from preschool through high school grades (e.g., Guthrie & Wigfield, 2000; Logan et al., 2011; Morgan & Fuchs, 2007; Retelsdorf, Köller, & Möller, 2011; Taboada et al., 2009). And more specifically, students who report lower feelings of perceived competence are less likely to engage in tasks to begin with and show poor task persistence, resulting in lower levels of achievement (Schunk & Zimmerman, 2006, 2012). However, these findings must be interpreted with caution as neither the MWR + MB nor the two treatment groups combined outperformed the control group on sentence-level comprehension—as such, alternative explanations are certainly plausible and require further investigation. Students in the MWR + MB group did not consistently outperform both the MWR-only and control groups on any study measures—and although it is unclear whether these effects may have been undetectable because of sample size, we believe that these findings should be of interest to interventionists.

Interestingly, while we noted that students in the MWR + MB group reported higher scores on attributions for success than those in the control group, we did not find significant differences between the MWR + MB and MWR-only groups on this measure. This study did not include varied measures of motivation and, as such, it is unclear whether the noted effect on sentence comprehension was due to the added value of the MB training or other features of those tutoring sessions (e.g., increasing students' cognitive engagement or attention to their performance). This requires further exploration.

Although the current findings require replication, they provide some initial support for the promise of targeting student motivation to intensify reading interventions. Because motivation is influenced by students' engagement with learning experiences, there is a strong argument to be made that motivation is a highly malleable factor. Numerous researchers have posited that motivation and engagement are constructs that can be changed (e.g., Benner, Graham, & Mistry, 2008; Jang, Reeve, & Deci, 2010; M. T. Wang & Holcombe, 2010). Many educators and educational researchers would agree that motivation is the link between student behaviors that support learning (e.g., engagement, persistence, help seeking) and reading achievement. As such, motivation is a critical contributing factor to reading performance that must be fully explored.

### Limitations and Future Research

This study has several limitations that must be noted. First, we did not include a proximal measure in our assessment battery that allowed us to make claims about students' learning of the affixes and multisyllabic words taught during the intervention. In addition, during development of the reading intervention, we did not explicitly control for the number of exposures students would receive to each affix and word. The findings from this study support our belief that struggling readers can build efficiency with reading multisyllabic words through repeated practice with reading word parts in isolation, blending and segmenting word parts, and being exposed to a large number of words. Our approach is consistent with Kearns's (2015) findings that students' morphological knowledge is highly predictive of their

ability to accurately read multisyllabic words and his recommendation that remedial reading instruction consider how to “build implicit knowledge in an explicit way” (p. 381). Future development of this intervention should ensure that there is consistency in the number of exposures across affixes and words if we hope for students to build strong word representations.

Second, based on our operationalization of intrinsic motivation, our training approach focused on enhancing students’ beliefs, both about themselves as readers and about reading itself. For future efficacy studies, we are interested in expanding the motivational beliefs training components to align with the hierarchy of motivation-related constructs proposed by Conradi, Jang, and McKenna (2014): goals (performance and mastery), beliefs (self-efficacy, self-concept, expectancies, task value), and predisposition (attitudes and interest toward reading). A broader approach to targeting motivational beliefs may enhance the impact of this training component. Further, it will be necessary to include a broader range of measures to capture these motivational constructs. In the current study, we measured performance attributions—which were limiting in being able to fully understand the impact of the added MB training. Measures that assess students’ goals, beliefs, and predispositions (as presented above) would provide greater understanding of the impact of the added MB training.

Further, we did not administer a standardized test that broadly measures reading comprehension. The WRAT4 subtest that we included in our assessment battery measures comprehension of one sentence based on a cloze response—and while this does not negate the reported findings, we are curious as to whether we might find a similar effect on a deeper comprehension task. And finally, as a pilot study, we were limited in our ability to explore potential moderators of intervention effects. We recognize that individual differences may affect students’ response to instruction, and future studies should explore the effect of factors, such as students’ entry level of sight word reading or decoding skills.

This experimental study provides tentative support for an embedded motivational beliefs training that enhances explicit instruction and strengthens reading outcomes. We also provide support for the efficacy of this word-reading intervention for upper elementary students, aimed at enhancing word-reading fluency through repeated exposure to multisyllabic words and word parts (i.e., morphemes) in isolation and in context. Although word reading is not often the primary goal of intervention programs for struggling readers in the upper elementary grades, we wish to underscore that poorly developed word recognition skills are considered by many to be the most incapacitating source of reading challenges (e.g., Adams, 1990; Perfetti, 1985). This is even more true because of the role decoding skills play in the acquisition of vocabulary and reading comprehension skills (Stanovich, 1996). Nonetheless, research has found that multicomponent interventions have a greater effect on reading comprehension for students in upper elementary (Wanzek et al., 2010) and secondary grades (Kamil et al., 2008; Scammacca et al., 2007; Torgesen et al., 2007) than interventions focused on just one component of reading. The ultimate goal of this work is to develop highly effective remedial instruction targeting MWR skills that can then be incorporated with multicomponent reading interventions.

## Note

This research was supported in part by an internal grant awarded by the University of Texas at Austin to the first author and by the Institute of Education Sciences, U.S. Department of Education, through grant R305F100013 to the University of Texas at Austin as part of the Reading for Understanding Research Initiative. The opinions expressed are those of the authors and do not represent views of the institute or the U.S. Department of Education. Jessica R. Toste is an assistant professor in the Department of Special Education and a fellow in the Meadows Center for Preventing Educational Risk at the University of Texas at Austin. Philip Capin is a doctoral candidate in the Department of Special Education and the Meadows Center for Preventing Educational Risk at the University of Texas at Austin. Sharon Vaughn is the Manuel J. Justiz Endowed Chair in Education and executive director of the Meadows Center for Preventing Educational Risk at the University of Texas at Austin. Garrett J. Roberts is an assistant professor in the Department of Teaching and Learning Sciences at the University of Denver. Devin M. Kearns is an assistant professor in the Department of Educational Psychology at the University of Connecticut. Correspondence may be sent to Jessica R. Toste at [jrtoste@austin.utexas.edu](mailto:jrtoste@austin.utexas.edu).

## References

- Adams, M. J. (1990). *Beginning to read: Thinking and learning about print*. Cambridge, MA: MIT Press.
- Archer, A. L., Gleason, M. M., & Vachon, V. L. (2003). Decoding and fluency: Foundation skills for struggling older readers. *Learning Disability Quarterly*, *26*(2), 89–101.
- Baker, L., & Wigfield, A. (1999). Dimensions of children's motivation for reading and their relations to reading activity and reading achievement. *Reading Research Quarterly*, *34*(4), 452–477.
- Becker, M., McElvany, N., & Kortenbruck, M. (2010). Intrinsic and extrinsic motivation as predictors of reading literacy: A longitudinal study. *Journal of Educational Psychology*, *102*(4), 773–785.
- Benjamini, Y., & Hochberg, Y. (1995). Controlling the false discovery rate: A practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society Series B*, *57*, 289–300.
- Benner, A. D., Graham, S., & Mistry, R. S. (2008). Discerning individual and conjoint effects of ecological structures and processes on adolescents' educational outcomes. *Developmental Psychology*, *44*, 840–854.
- Berkeley, S., Mastropieri, M. A., & Scruggs, T. E. (2011). Reading comprehension strategy instruction and attribution retraining for secondary students with learning and other mild disabilities. *Journal of Learning Disabilities*, *44*(1), 18–32.
- Bhattacharya, A., & Ehri, L. C. (2004). Graphosyllabic analysis helps adolescent struggling readers read and spell words. *Journal of Learning Disabilities*, *37*(4), 331–348.
- Brasseur-Hock, I. F., Hock, M. F., Kieffer, M. J., Biancarosa, G., & Deshler, D. D. (2011). Adolescent struggling readers in urban schools: Results of a latent class analysis. *Learning and Individual Differences*, *21*(4), 438–452.
- Bryant, D. P., Ugel, N., Thompson, S., & Hamff, A. (1999). Instructional strategies for content-area reading instruction. *Intervention in School and Clinic*, *34*(5), 293–302.
- Chall, J. S., & Jacobs, V. A. (2003). The classic study on poor children's fourth-grade slump. *American Educator*, *27*(1), 14–15.
- Chapman, J. W., & Tunmer, W. E. (1997). A longitudinal study of beginning reading achievement and reading self-concept. *British Journal of Educational Psychology*, *67*, 279–291.
- Chapman, J. W., Tunmer, W. E., & Prochnow, J. E. (2000). Early reading-related skills and performance, reading self-concept, and the development of academic self-concept: A longitudinal study. *Journal of Educational Psychology*, *92*, 703–708.

- Cohen, A. S., Nienow, T. M., Dinzeo, T. J., & Docherty, N. M. (2009). Attribution biases in schizophrenia: Relationship to clinical and functional impairments. *Psychopathology*, *42*, 40–46.
- Compton, D. L., Fuchs, D., Fuchs, L. S., Bouton, B., Gilbert, J. K., Barquero, L. A., . . . Crouch, R. C. (2010). Selecting at-risk first-grade readers for early intervention: Eliminating false positives and exploring the promise of a two-stage gated screening process. *Journal of Educational Psychology*, *102*(2), 327–340.
- Connor, C. M., Morrison, F. J., Fishman, B. J., Schatschneider, C., & Underwood, P. (2007). The early years: Algorithm-guided individualized reading instruction. *Science*, *315*, 464–465.
- Conradi, K., Jang, B. G., & McKenna, M. C. (2014). Motivation terminology in reading research: A conceptual review. *Educational Psychology Review*, *26*, 127–164.
- Cunningham, A. E., & Stanovich, K. E. (1991). Tracking the unique effects of print exposure in children: Associations with vocabulary, general knowledge, and spelling. *Journal of Educational Psychology*, *83*(2), 264–274.
- Diliberto, J. A., Beattie, J. R., Flowers, C. P., & Algozzine, R. F. (2009). Effects of teaching syllable skills instruction on reading achievement in struggling middle school readers. *Literacy Research and Instruction*, *48*(1), 14–27.
- Dynarski, M., Clarke, L., Cobb, B., Finn, J., Rumberger, R., & Smink, J. (2008). *Dropout prevention: IES practice guide* (NCEE 2008-4025). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance. Retrieved from <http://ies.ed.gov/ncee/wwc>
- Elbaum, B., Vaughn, S., Tejero Hughes, M., & Watson Moody, S. (2000). How effective are one-to-one tutoring programs in reading for elementary students at risk for reading failure? A meta-analysis of the intervention research. *Journal of Educational Psychology*, *92*(4), 605–619.
- Enders, C. K., & Tofighi, D. (2007). Centering predictor variables in cross-sectional multilevel models: A new look at an old issue. *Psychological Methods*, *12*(2), 121–138.
- Fletcher, J. M., Lyon, G. R., Fuchs, I. S., & Barnes, M. A. (2007). *Learning disabilities: From assessment to intervention*. New York: Guilford.
- Francis, D. J., Shaywitz, S. E., Stuebing, K. K., Shaywitz, B. A., & Fletcher, J. M. (1996). Developmental lag versus deficit models of reading disability: A longitudinal, individual growth curves study. *Journal of Educational Psychology*, *88*, 3–17.
- Goodwin, A. P., & Ahn, S. (2013). A meta-analysis of morphological interventions in English: Effects on literacy outcomes for school-age children. *Scientific Studies of Reading*, *17*(4), 257–285.
- Gottfried, A. E. (1985). Academic intrinsic motivation in elementary and junior high school students. *Journal of Educational Psychology*, *77*(6), 631–645.
- Gottfried, A. E., Fleming, J. S., & Gottfried, A. I. (2001). Continuity of academic intrinsic motivation from childhood through late adolescence: A longitudinal study. *Journal of Educational Psychology*, *93*, 3–13.
- Gough, P., & Tunmer, W. (1986). Decoding, reading, and reading disability. *Remedial and Special Education*, *7*, 6–10.
- Guthrie, J. T., McRae, A., & Klauda, S. L. (2007). Contributions of Concept-Oriented Reading Instruction to knowledge about interventions for motivations in reading. *Educational Psychologist*, *42*, 237–250.
- Guthrie, J. T., & Wigfield, A. (2000). Engagement and motivation in reading. In M. L. Kamil, P. B. Mosenthal, P. D. Pearson, & R. Barr (Eds.), *Handbook of reading research*. Mahwah, NJ: Erlbaum.
- Guthrie, J. T., Wigfield, A., Barbosa, P., Perencevich, K. C., Taboada, A., Davis, M. H., . . . Tonks, S. (2004). Increasing reading comprehension and engagement through Concept-Oriented Reading Instruction. *Journal of Educational Psychology*, *96*, 403–423.
- Gwet, K. (2001). *Handbook of inter-rater reliability: How to estimate the level of agreement between two or multiple raters*. Gaithersburg, MD: StatAxis.

- Hiebert, E. H. (2003). *QuickReads: A research-based fluency program*. Parsippany, NJ: Pearson Education.
- Hiebert E. H., Martin L. A., & Menon S. (2005). Are there alternatives in reading textbooks? An examination of three reading programs. *Reading & Writing Quarterly*, *21*, 7–32.
- Jang, H., Reeve, J., & Deci, E. L. (2010). Engaging students in learning activities: It's not autonomy support or structure, but autonomy support and structure. *Journal of Educational Psychology*, *102*, 588–600.
- Just, M. A., & Carpenter, P. A. (1987). *The psychology of reading and language comprehension*. Newton, MA: Allyn & Bacon.
- Kamil, M. L., Borman, G. D., Dole, J., Kral, C. C., Salinger, T., & Torgesen, J. (2008). *Improving adolescent literacy: Effective classroom and intervention practices: A practice guide* (NCEE 2008-4027). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.
- Kearns, D. M. (2015). How elementary-age children read polysyllabic polymorphemic words. *Journal of Educational Psychology*, *107*(2), 364–390.
- Kearns, D. M., Steacy, L. M., Compton, D. L., Gilbert, J. K., Goodwin, A. P., Cho, E., . . . Collins, A. A. (2015). Modeling polymorphemic word recognition: Exploring differences among children with early-emerging and late-emerging word reading difficulty. *Journal of Learning Disabilities*, *49*(4), 368–394. doi:10.1177/0022219414554229
- Leach, J. M., Scarborough, H. S., & Rescorla, L. (2003). Late-emerging reading disabilities. *Journal of Educational Psychology*, *95*(2), 211–224.
- Lenz, B. K., & Hughes, C. A. (1990). A word identification strategy for adolescents with learning disabilities. *Journal of Learning Disabilities*, *23*(3), 149–158.
- Lipsey, M. W., Puzio, K., Yun, C., Hebert, M. A., Steinka-Fry, K., Cole, M. W., . . . Busick, M. D. (2012). *Translating the statistical representation of the effects of education interventions into more readily interpretable forms* (NCSE 2013-3000). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.
- Logan, S., & Medford, E. (2011). Gender differences in the strength of association between motivation, competency beliefs and reading skill. *Educational Research*, *53*(1), 85–94.
- Logan, S., Medford, E., & Hughes, N. (2011). The importance of intrinsic motivation for high and low ability readers' reading comprehension performance. *Learning and Individual Differences*, *21*, 124–128.
- Mathes, P. G., Denton, C. A., Fletcher, J. M., Anthony, J. L., Francis, D. J., & Schatschneider, C. (2005). The effects of theoretically different instruction and student characteristics on the skills of struggling readers. *Reading Research Quarterly*, *40*(2), 148–182.
- McGrew, K. S., Shrank, F. A., & Woodcock, R. W. (2007). *Woodcock-Johnson III normative update* (Technical manual). Rolling Meadows, IL: Riverside.
- Moats, L. C. (1999). *Teaching reading is rocket science*. Washington, DC: American Federation of Teachers.
- Morgan, P. L., & Fuchs, D. (2007). Is there a bidirectional relationship between children's reading skills and reading motivation? *Exceptional Children*, *73*, 165–183.
- Multon, K. D., Brown, S. D., & Lent, R. W. (1991). Relation of self-efficacy beliefs to academic outcomes: A meta-analysis. *Journal of Counseling Psychology*, *38*, 30–38.
- Muthén, B. O., & Muthén, L. K. (2014). *Mplus user's guide: Statistical analysis with latent variables*. Los Angeles: Muthén & Muthén.
- Nagy, W. E., & Anderson, R. C. (1984). How many words are there in printed school English? *Reading Research Quarterly*, *19*(3), 304–330.
- National Assessment of Educational Progress. (2015). *The nation's report card: Reading 2015*. Washington, DC: National Center for Education Statistics.
- National Reading Panel. (2000). *Report on the National Reading Panel: Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction* (NIH Publication No. 00-4754). Washington, DC: U.S. Government Printing Office.

- O'Connor, R., & Fuchs, L. S. (2013). Responsiveness to intervention in the elementary grades: Implications for early childhood education. In V. Buysse, E. Peisner-Feinberg, & J. Cantler (Eds.), *Handbook of response to intervention (RTI) in early childhood education* (pp. 41–56). Baltimore: Brookes.
- Perfetti, C. A. (1985). Reading skills. *Psychiatry*, *50*, 1125–1129.
- Perfetti, C. A. (1986). Continuities in reading acquisition, reading skill, and reading disability. *Remedial and Special Education*, *7*(1), 11–21.
- Perfetti, C. A. (1992). The representation problem in reading acquisition. In P. B. Gough, L. C. Ehri, & R. Treiman (Eds.), *Reading acquisition* (pp. 145–174). Hillsdale, NJ: Erlbaum.
- Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology*, *95*(4), 667.
- Retelsdorf, J., Köller, O., & Möller, J. (2011). On the effects of motivation on reading performance growth in secondary school. *Learning and Instruction*, *21*(4), 550–559.
- Sattler, J. M., & Hoge, R. D. (2006). *Assessment of children: Behavioral, social, and clinical foundations*. La Mesa, CA: Jerome M. Sattler.
- Scammacca, N., Roberts, G., Vaughn, S., Edmonds, M., Wexler, J., Reutebuch, C. K., & Torgesen, J. K. (2007). *Interventions for adolescent struggling readers: A meta-analysis with implications for practice*. Portsmouth, NH: RMC Research Corporation, Center on Instruction.
- Scammacca, N. K., Roberts, G., Vaughn, S., & Stuebing, K. K. (2015). A meta-analysis of interventions for struggling readers in grades 4–12: 1980–2011. *Journal of Learning Disabilities*, *48*(4), 369–390.
- Schunk, D. H. (1991). Self-efficacy and academic motivation. *Educational Psychologist*, *26*, 207–231.
- Schunk, D. H., & Zimmerman, B. J. (2006). Competence and control beliefs: Distinguishing the means and ends. *Handbook of educational psychology* (2nd ed., pp. 349–367). New York: Routledge.
- Schunk, D. H., & Zimmerman, B. J. (2012). Self-regulation and learning. In W. M. Reynolds & G. E. Miller (Eds.), *Handbook of psychology: Educational psychology* (Vol. 7, pp. 45–68). Hoboken, NJ: Wiley.
- Schutz, P. A., & Pekrun, R. (Eds.). (2007). *Emotions in education*. San Diego, CA: Academic.
- Shankweiler, D. (1999). Words to meanings. *Scientific Studies of Reading*, *3*(2), 112–127.
- Shankweiler, D., Crain, S., Brady, S., & Macaruso, P. (1992). Identifying the causes of reading disabilities. In P. B. Gough, L. C. Ehri, & R. Treiman (Eds.), *Beginning reading* (pp. 275–305). Hillsdale, NJ: Erlbaum.
- Shefelbine, J. L. (1990). Student factors related to variability in learning word meanings from context. *Journal of Literacy Research*, *22*(1), 71–97.
- Shefelbine, J., & Calhoun, J. (1991). Variability in approaches to identifying polysyllabic words: A descriptive study of sixth graders with highly, moderately, and poorly developed syllabification strategies. In J. Zutell & S. McCormick (Eds.), *Learner factors/teacher factors: Issues in literacy research and instruction* (pp. 169–177). Chicago: National Reading Council.
- Shell, D. F., Colvin, C., & Bruning, R. H. (1995). Self-efficacy, attribution, and outcome expectancy mechanisms in reading and writing achievement: Grade-level and achievement-level differences. *Journal of Educational Psychology*, *87*(3), 386–398.
- Stanovich, K. E. (1996). Toward a more inclusive definition of dyslexia. *Dyslexia*, *2*(3), 154–166.
- Swan, E. A. (2003). *Concept-oriented reading instruction: Engaging classrooms, lifelong learners*. New York: Guilford.
- Taboada, A., Tonks, S. M., Wigfield, A., & Guthrie, J. T. (2009). Effects of motivational and cognitive variables on reading comprehension. *Reading and Writing*, *22*, 85–106.
- Toland, J., & Boyle, C. (2008). Applying cognitive behavioural methods to retrain children's attributions for success and failure in learning. *School Psychology International*, *29*(3), 286–302.
- Torgesen, J. K. (1998). Catch them before they fall. *American Educator*, *22*, 32–41.
- Torgesen, J. K. (2000). Individual differences in response to early interventions in reading: The lingering problem of treatment resisters. *Learning Disabilities Research & Practice*, *15*(1), 55–64.

- Torgesen, J. K., & Hayes, L. (2003). Diagnosis of reading difficulties following inadequate performance on state level reading outcome measures. *CORE Reading Expert* (Newsletter). Emeryville, CA: Consortium on Reading Excellence.
- Torgesen, J. K., Houston, D. D., Rissman, L. M., Decker, S. M., Roberts, G., Vaughn, S., . . . Lesaux, N. (2007). *Academic literacy instruction for adolescents: A guidance document from the Center on Instruction*. Portsmouth, NH: RMC Research Corporation, Center on Instruction. Retrieved from <http://files.eric.ed.gov/fulltext/ED521837.pdf>
- Torgesen, J. K., Wagner, R. K., & Rashotte, C. A. (2012). *Test of word reading efficiency* (2nd ed.). Austin, TX: PRO-ED.
- Torgesen, J. K., Wagner, R. K., Rashotte, C. A., Rose, E., Lindamood, P., Conway, T., & Garvan, C. (1999). Preventing reading failure in young children with phonological processing disabilities: Group and individual responses to instruction. *Journal of Educational Psychology*, *91*(4), 579–593.
- Vansteenkiste, M., Lens, W., & Deci, E. L. (2006). Intrinsic versus extrinsic goal contents in self-determination theory: Another look at quality of academic motivation. *Educational Psychologist*, *41*(1), 19–31.
- Vaughn, S., Linan-Thompson, S., Kouzekanani, K., Bryant, D. P., Dickson, S., & Blozis, S. A. (2003). Reading instruction grouping for students with reading difficulties. *Remedial and Special Education*, *24*, 301–315.
- Vellutino, F. R., Scanlon, D. M., Sipay, E. R., Small, S. G., Pratt, A., Chen, R., & Denckla, M. B. (1996). Cognitive profiles of difficult-to-remediate and readily remediated poor readers: Early intervention as a vehicle for distinguishing between cognitive and experiential deficits as basic causes of specific reading disability. *Journal of Educational Psychology*, *88*(4), 601–638.
- Wagner, R. K., & Torgesen, J. K. (1987). The nature of phonological processing and its causal role in the acquisition of reading skills. *Psychological Bulletin*, *101*, 192–212.
- Wang, J. H. Y., & Guthrie, J. T. (2004). Modeling the effects of intrinsic motivation, extrinsic motivation, amount of reading, and past reading achievement on text comprehension between US and Chinese students. *Reading Research Quarterly*, *39*(2), 162–186.
- Wang, M. T., & Degol, J. (2014). Staying engaged: Knowledge and research needs in student engagement. *Child Development Perspectives*, *8*(3), 137–143.
- Wang, M. T., & Holcombe, R. (2010). Adolescents' perceptions of school environment, engagement, and academic achievement in middle school. *American Educational Research Journal*, *47*(3), 633–662.
- Wanzek, J., & Vaughn, S. (2007). Research-based implications from extensive early reading interventions. *School Psychology Review*, *36*(4), 541–561.
- Wanzek, J., Vaughn, S., Scammacca, N., Gatlin, B., Walker, M. A., & Capin, P. (2016). Meta-analyses of the effects of tier 2 type reading interventions in grades K–3. *Educational Psychology Review*, *28*, 551–576.
- Wanzek, J., Wexler, J., Vaughn, S., & Ciullo, S. (2010). Reading interventions for struggling readers in the upper elementary grades: A synthesis of 20 years of research. *Reading and Writing*, *23*(8), 889–912.
- Weiner, B. (1986). *An attributional theory of motivation and emotion*. New York: Springer.
- Weiner, B. (2000). Motivation. In A. E. Kazdin (Ed.), *Encyclopedia of psychology* (Vol. 5, pp. 134–137). Washington, DC: American Psychological Association.
- White, T. G., Sowell, J., & Yanagihara, A. (1989). Teaching elementary students to use word-part clues. *Reading Teacher*, *42*(4), 302–308.
- Wigfield, A., & Guthrie, J. T. (1997). Relations of children's motivation for reading to the amount and breadth of their reading. *Journal of Educational Psychology*, *89*, 420–432.
- Wilkinson, G. S., & Robertson, G. J. (2006). *Wide Range Achievement Test* (4th ed.). Lutz, FL: Psychological Assessment Resources.
- Yuill, N., & Oakhill, J. (1991). *Children's problems in text comprehension: An experimental investigation*. Cambridge: Cambridge University Press.