A TWO-STUDY EXAMINATION OF STUDENT ENGAGEMENT AND ITS RELATION TO ADOLESCENT READING COMPREHENSION

A Dissertation

by

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ABSTRACT

The purpose of this research—which was divided into two parts—was to evaluate the extent to which adolescent reading comprehension research has addressed student engagement and examine the relationship between engagement, classroom practices, students' reading skills, and comprehension. Study 1 reviewed adolescent reading comprehension intervention research published between the years 2000 and 2014 to examine the presence of engagement-enhancing practices. Additionally, it examined the extent to which engagement was measured, the dimensions of engagement commonly measured, the most common methods of measurement, and whether engagement was statistically linked to student outcomes. Study 2 examined whether behavioral and cognitive engagement mediated the impact of classroom practices and conditions on comprehension and whether students' entry-level reading skills moderated the influence of behavioral and cognitive engagement on comprehension.

In Study 1, a systematic literature review of adolescent reading comprehension interventions revealed 76 articles (80 studies) published between 2000 and 2014 that were coded for inclusion of engagement-enhancing components and measurement of engagement. Most of these studies (95%) included at least one engagement-enhancing component, but only 9% measured engagement. Findings of the limited studies (3%) that examined the relationship between engagement and outcomes indicated statistically significant effects for interventions that incorporated engagement-enhancing practices.

Study 2 used structural equation modeling with two latent predictor factors (classroom practices and engagement) and one observed outcome (comprehension)

gathered in the context of a multi-component reading comprehension intervention study designed to increase students' comprehension of complex text. Findings indicated that behavioral engagement significantly predicted comprehension in both the treatment and business-as-usual conditions, but behavioral engagement only partially mediated the impact of classroom practices and conditions on comprehension in the treatment condition. Cognitive engagement did not significantly predict comprehension outcomes, nor did it act as a mediator. Students' entry-level reading skills did not interact with their behavioral or cognitive engagement to predict comprehension.

Both studies highlight the importance of engagement and provide preliminary evidence to support the relationship between classroom practices, engagement, and comprehension. More research is needed to better define and measure the multiple dimensions of engagement and determine which specific practices influence engagement, and how they do so.

DEDICATION

To all the students and teachers with whom I have worked throughout the years—you inspire and motivate me, and I am forever grateful. You are and will always be at the forefront of my mind as I continue on in this profession. You make me laugh, make me think, and make me proud.

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Student Engagement and Comprehension

Educational research has increasingly focused on the construct of student engagement and its contribution to academic success (Fredricks, Blumenfeld, & Paris, 2004). This interest in engagement is driven by the desire to improve student learning since the more academically engaged students are, the higher their achievement tends to be (Reschly & Christenson, 2012). In the most general sense, engagement is the involvement, participation, and commitment to a set of activities (Guthrie, Wigfield, & You, 2012). There are multiple definitions of engagement; however, it is often seen as a multi-dimensional construct made up of three dimensions that include cognitive, affective, and behavioral. The dimension of behavioral engagement also includes a subtype of academic engagement (Reschly & Christenson, 2012). It is theorized that these dimensions of engagement are mediators between contexts (e.g., school instruction, community, peers, family), students, and learning outcomes (e.g., reading comprehension; Reschly & Christenson, 2012).

In the area of reading in particular, student engagement is a crucial component for successful text comprehension, yet large numbers of students are disengaged, making it difficult for them to comprehend complex texts (Guthrie, Wigfield, & You, 2012). In the research reported in this dissertation, I provide a context for engagement and examine the relationship of engagement to adolescents' reading comprehension. Study 1 is a review of adolescent reading comprehension interventions published between the years 2000-2014. Articles were coded for specific instructional/classroom practices postulated to

promote student engagement and to determine whether engagement was measured, the dimensions of engagement measured, how it was measured, and whether engagement was linked to student outcomes. Article two used extant data from a reading comprehension study to examine (a) the roles of cognitive (i.e., self-regulation) and behavioral engagement (i.e., effort and persistence) in mediating the path of overall classroom practice and conditions on reading comprehension, and (b) how the effect of behavioral and cognitive engagement on reading comprehension was moderated by students' initial reading skills (i.e., word reading, comprehension).

Introduction to Adolescent Reading Comprehension and the Role of Engagement in Adolescent Reading Comprehension

Reading with comprehension involves significant levels of engagement that include the active processing and construction of meaning from text; thus, good comprehenders are able to create a coherent representation of what they read (Kintsch, 1998). On the National Assessment of Educational Progress (National Center for Education Statistics, 2012), however, only 34% of eighth-graders and 38% of 12th-graders met reading proficiency standards. Current reading levels indicate many students are not prepared to read and comprehend difficult texts, which creates major barriers to their success in higher education and the workforce (Carnegie Council on Advancing Adolescent Literacy, 2010). Standards recently adopted by many states in the Common Core Standards Initiative summarize the expectations for secondary students (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). These standards articulate what students should be able to do as they read literature and informational text and reflect the skills and strategies students need to

read grade-level text proficiently. There is a gap, however, between students' current levels of reading performance and the increased emphasis on high expectations. This gap underscores the need to examine ways to promote students' reading comprehension.

Student Engagement

One of the theorized contributors to low reading proficiency is a lack of student engagement (Guthrie, Wigfield, & You, 2012; Reschly & Christenson, 2012). It is estimated that by high school, approximately 40-60% of youth are disengaged in school and show signs of being uninvolved, apathetic, unmotivated, and inattentive (Marks, 2000). The most general definition of engagement is the involvement, participation, and commitment to some set of activities (Guthrie, Wigfield, & You, 2012). Reschly and Christenson (2012) posited a multi-dimensional definition of engagement, which includes three dimensions (i.e., cognitive, behavioral, affective). They explained engagement as a mediator between contexts, such as school, and outcomes, such as performance on standardized tests (Reschly & Christenson, 2012). In other words, engagement is a key contributor to school success because the more engaged students are in their learning, the higher their academic outcomes are likely to be (Fredricks et al., 2004). Research supports the impact of engagement that is both short term, in that it predicts students' learning, grades, and achievement test scores, and long term, in that it predicts attendance, graduation, and academic resilience (Finn & Rock, 1997). As students progress through school, however, engagement levels decline, and their interest, enthusiasm, and motivation to learn decreases. This decline becomes even more dramatic as students transition from middle to high school (Skinner, Furrer, Marchand, & Kindermann, 2008). Disengagement for middle and high school adolescents can have

severe consequences, such as limited employment opportunities, an increased risk of poverty, and a less likely chance of graduating from high school (National Research Council and Institute of Medicine, 2004).

The study of engagement is complicated because there is a lack of consensus about its definition as well as the number of dimensions (e.g., two-, three-, and four-subtype models; Reschly & Christenson, 2012). The majority of researchers, however, do agree that there are a minimum of two dimensions of engagement: one a participation dimension and the other an affective dimension (Lee, 2014). Reschly and Christenson (2012) proposed a more general model that includes three dimensions of engagement. Within this model, the three dimensions include cognitive, affective, and behavioral. Under the behavioral dimension, they also include a subtype of academic engagement. Cognitive engagement is students' level of investment in learning and being strategic in the learning process (Fredricks & McColskey, 2012). Students with high levels of cognitive engagement are more thoughtful and strategic, and are willing to work until they understand complex ideas or difficult skills (Fredricks et al., 2004). Students who are cognitively engaged see the relevance of school to future goals and are able to self-regulate their learning (Reschly & Christenson, 2012). Affective or emotional engagement is the extent to which students feel negatively or positively toward teachers, classmates, and/or school (Fredricks & McColskey, 2012). Students are more emotionally engaged if they feel a strong identification with the school they attend, or if they feel like they belong, are important, and are valued (Finn, 1989). High emotional engagement creates a tie to the school, which increases their motivation to work hard (Connell & Wellborn, 1991). Finally, behavioral engagement includes participation, such

as involvement in academic, social, and/or extracurricular activities (Fredricks & McColskey, 2012). Students who are engaged at the behavioral level follow classroom rules, attend school regularly, and do not get into trouble (Finn & Rock, 1997). Behavioral engagement is essential for positive academic achievement (Connell & Wellborn, 1991; Finn, 1989). A subtype of behavioral engagement is "academic," which includes students' levels of time on task, homework completion, grades, and credit hours earned (Reschly & Christenson, 2012).

Engagement has been identified as a potential mediator between the context (i.e., school, community, families, peers) and desired outcomes (i.e., academic, social, emotional; Reschly & Christenson, 2012). Student engagement levels need not remain low, however, since it is possible to increase engagement in learning. As students become engaged, the contexts they are in allow for feedback and support that ultimately leads to higher engagement levels, which positively impact student outcomes (Reschly, 2010; Reschly & Christenson, 2012). Thus, it is important that teachers understand the role engagement plays in student achievement and are aware of activities to improve student engagement.

Engagement and Reading Comprehension

In the area of reading comprehension, engagement is positively correlated with reading outcomes (Guthrie & Wigfield, 2000). While the model posited by Reschly and Christenson (2012) applies to a range of outcomes, Guthrie and Wigfield (2000) examined student engagement in relation to reading and defined engagement as the interaction with text that is both strategic and motivated. Students who are engaged readers are motivated to read, strategic in how they approach reading tasks,

knowledgeable in how to construct meaning from text, and interactive with others while reading (Guthrie, McGough, Bennett, & Rice, 1996; Guthrie & Wigfield, 2000; Guthrie, Wigfield, & Perencevich, 2004). Engagement in reading is essential to comprehending complex text, yet there are high proportions of students who are disengaged when reading (Guthrie, Wigfield, & You, 2012). For adolescents, engagement is particularly important since this is the period of time when students become increasingly disinterested in learning. Torgeson et al. (2007) identified six important factors for successful reading comprehension at the middle and high school levels, one of which included high levels of motivation and engagement for understanding and learning from text. Additionally, Kamil et al. (2008) recommended the importance of increasing student motivation and engagement in literacy. They recommended that teachers use strategies to enhance students' motivation to read and engagement in the learning process by building confidence in their ability to comprehend, providing a supportive environment, encouraging self-determination, and providing feedback about the usefulness of reading strategies. Engaged reading is both a means to achievement, in that engaged readers are more successful in reading than disengaged readers, and an important educational outcome (Guthrie, & Humenick, 2004). Guthrie, Wigfield, and You (2012) proposed a model of reading engagement processes within classroom contexts that aligns with the model of engagement posited by Reschly and Christenson (2012). The Guthrie, Wigfield, and You (2012) model is specific to reading comprehension. In their model, classroom practice and conditions (i.e., instruction) can promote engagement by impacting student motivation, strategy use, conceptual knowledge, and peer interactions, all of which then increase reading outcomes. Their broad definition of classroom practice

and conditions includes the characteristics of the classroom that impact student achievement. These characteristics may include teachers' instructional practices, such as the quality of instruction, class climate, teacher affect, and classroom management.

One component of classroom practice and conditions is teachers' instructional practices. Guthrie, Wigfield, and You (2012) suggested specific instructional practices shown to increase student engagement in reading, which include the use of interesting texts, explicit strategy instruction, praise and rewards, student evaluation, collaboration with peers, autonomy support, and technology (Russell, Bebell, & Higgins, 2004). An important assumption in this model is that engagement acts as a mediator between classroom practices and conditions and reading outcomes. In other words, the effect that classroom practices and conditions have on reading competence may differ depending on the engagement levels of individual students (Guthrie, Wigfield, & You, 2012; Reschly & Christenson, 2012; Skinner & Belmont, 1993). Classroom contexts (e.g., quality of instruction, teachers' instructional practices, class climate, teacher affect, teachers' classroom management) impact student outcomes (e.g., reading comprehension) to the extent that they create high levels of student engagement (e.g., cognitive, behavioral).

Dissertation Purpose

Given the importance of engagement to student outcomes, this dissertation was designed to advance the understanding of the role and influence of engagement to reading comprehension through two related studies. The first study was a comprehensive review of the literature using the conceptual framework proposed by Guthrie, Wigfield, and You (2012) to identify the specific instructional/classroom practices targeted at increasing engagement most used in adolescent reading comprehension interventions. Additionally,

it examined the extent to which engagement was measured, the dimensions of engagement most measured, the most common methods of measurement, and whether or not engagement was statistically linked to student outcomes. The research questions addressed include:

1. To what degree do reading comprehension interventions involving adolescents include components shown to increase student engagement? And which components were most prominently used?
2. What percentage of the studies measured engagement? And which dimensions of engagement were measured (e.g., cognitive, behavioral)?
3. What were the most common methods of measurement (e.g., student report, teacher report, observation)? And what specific engagement measures were used (e.g., Reading Engagement Index)?
4. What percentage of articles reported a relation between engagement and student outcomes? If engagement was statistically linked to student outcomes, were effect sizes significant?

The second study investigated the role of engagement in the reading process by examining broader classroom practices and conditions (i.e., instructional quality, class climate, teachers' classroom management, and teacher affect) and how they impacted students' engagement and reading comprehension. Extant data from a randomized controlled trial studying the effects of a multi-component reading comprehension intervention on student comprehension outcomes were used to examine whether engagement (i.e., cognitive, behavioral), specifically students' effort, persistence and self-regulation, mediated the effect of classroom practice and conditions (i.e., quality of

instruction, teacher affect, classroom climate, and classroom management) on reading comprehension outcomes. Additionally, it examined whether the effect of engagement on reading comprehension was moderated by students' initial reading skill level (i.e., comprehension and word reading). Specific research questions included:

1. To what extent is the effect of classroom practice and conditions (i.e., quality of instruction, classroom management, teacher affect, class climate) on reading comprehension mediated by the students' levels of cognitive and behavioral engagement in both the treatment and business-as-usual conditions?
2. Is the effect of behavioral and cognitive engagement (i.e., self-regulation, effort/persistence) on reading comprehension achievement moderated by students' initial reading skills (i.e., word reading and comprehension) in both the treatment and business-as-usual conditions?

A LITERATURE REVIEW OF STUDENT ENGAGEMENT WITHIN ADOLESCENT READING COMPREHENSION INTERVENTIONS

Engagement is a multi-dimensional construct encompassing students' thoughts, feelings, and behaviors (Fredricks et al., 2004). Students who are committed to the learning process and actively involved in their learning are highly engaged (Fredricks et al., 2004; Reschly & Christenson, 2012). In the area of reading, theories generally agree that a reader's engagement with the text is crucial to comprehension (Baker & Wigfield, 1999; Schiefele, Schaffner, Möller, & Wigfield, 2012). Engagement in reading refers to one's effort and persistence in a reading task and time devoted toward the attainment of desired reading outcomes (Guthrie, Wigfield, & You, 2012; Klauda & Guthrie, 2015). Students who are engaged in the reading process are strategic in how they approach a reading task, are able to self-regulate their learning, are invested in the reading process, and are socially interactive when reading (Guthrie & Cox, 2001; Guthrie, Wigfield, & You, 2012). As students progress into middle and high school, however, their engagement in reading declines significantly (Guthrie, Wigfield, & You, 2012). It is estimated that 24-40% of adolescents show signs of disengagement (Steinberg, Brown, & Dornbush, 1997; Yazzie-Mintz, 2007). For students with reading difficulties, especially those from low socioeconomic backgrounds, the decline in engagement is even more severe (Skinner et al., 2008).

For struggling readers, engagement in reading is even more crucial than it is for their higher-achieving counterparts. The struggling reader is often viewed as a low achiever who is lacking in areas such as reading comprehension, vocabulary knowledge,

study skills, word reading, and fluency (Guthrie & Davis, 2003). While research supports that view of struggling readers (Bryant, Ugel, Thompson, & Hamff, 1999; Pressley & Allington, 1999), Moje, Young, Readence, and Moore (2000) suggested that the definition of a struggling reader should be extended to include disengagement from reading. Struggling readers tend to be unmotivated and have low self-efficacy or confidence in their reading abilities (Wigfield, Eccles, & Rodriguez, 1998). They are also driven to read more by extrinsic rewards, such as grades, rather than by the enjoyment of reading (Guthrie & Davis, 2003). Additionally, struggling readers often procrastinate, avoid putting in effort by not studying, and attribute their low achievement to a lack of effort rather than a lack of ability (Midgley & Urdan, 1995). Finally, struggling readers are often disengaged from school as a whole, are likely to feel uncomfortable in school, and are less interested in being accepted by their high-achieving counterparts (Anderman, 1999).

Fortunately, engagement is malleable because it fluctuates depending on how individuals interact within their context (Fredricks et al., 2004). As the environment or context changes, students' engagement levels change as well (Skinner, Wellborn, & Connell, 1990; Finn & Rock, 1997). In the area of reading, engagement likewise fluctuates with the learning context. In the model of reading engagement proposed by Guthrie, Wigfield, and You (2012), there is a direct relation of classroom practices and conditions to reading competence. Additionally, the relation of classroom practices to reading competence in this model is mediated by students' engagement. In other words, certain classroom practices and conditions directly impact students' engagement, which ultimately affects their text comprehension (Guthrie, Wigfield, & You, 2012). The logic

chain posits that the more instructional practices that increase student engagement are used, the more students will be engaged, and the higher their comprehension is likely to be.

Numerous classroom practices and conditions (e.g., strategy instruction, providing relevance, autonomy support) have been empirically demonstrated to increase student engagement. Therefore, instructional practices that increase active engagement in text processing are plausibly linked to successful text comprehension and achievement overall (Guthrie & Davis, 2003; Guthrie, Wigfield, & You, 2012; Skinner et al., 2008).

Intuitively, the degree to which students are engaged can influence reading comprehension, and more specifically, the practices that teachers use can influence student engagement. The purpose of this study was to review the extant research literature to better understand the prevalence of student engagement components in reading comprehension interventions and the methodologies used to measure and examine student engagement.

Literature Review

The following sections contain a review of the literature on (a) the classroom practices and conditions that have been linked to an increase in student engagement, (b) intervention studies that include engagement-building components, (c) dimensions of engagement, (d) methods of measuring engagement, (e) engagement levels and student outcomes, and (f) student engagement research.

Classroom Practices and Conditions That Increase Student Engagement

Within the context of the classroom, there are numerous instructional practices that specifically increase student engagement (e.g., autonomy support and providing

interesting texts) (Guthrie, Wigfield, & You, 2012; Guthrie, Klauda, & Ho, 2013). Many correlational and classroom-based experimental and quasi-experimental studies have shown that these practices positively relate to engagement and student achievement (Guthrie & Humenick, 2004). Ten instructional practices (see Appendix A) that increase students' engagement in reading include the use of (a) learning and knowledge goals, (b) real-world interactions, (c) autonomy support, (d) interesting texts, (e) relevance, (f) strategy instruction, (g) collaboration support, (h) praise and rewards, (i) student evaluation, and (j) technology (Guthrie & Davis, 2003; Russell et al., 2004).

Learning and knowledge goals. Learning and knowledge goals provide an organizing framework for teaching and learning and involve planning reading tasks around an overall theme, choosing a variety of texts that center on this theme, and setting goals for students so that they understand the standard they are expected to reach (Guthrie & Cox, 2001; Kamil et al., 2008). Using conceptual themes and planning learning around those themes helps students make connections among concepts and ultimately increases their interest and engagement in the topic (Alexander & Jetton, 1996). Additionally, when there are standards or goals for students to achieve, they are more likely to maintain their effort and persistence until they reach that goal (Kamil et al., 2008). These learning goals may be set by the teacher, but if students set their own goals, they are more likely to engage in the activities needed to reach those goals (Kamil et al., 2008).

Real-world interaction. Real-world interactions provide opportunities for students to see, hear, feel, or smell tangible objects or events that connect to the reading task or topic (Guthrie & Cox, 2001; Guthrie, Wigfield, & You, 2012). Examples include

reenacting a historical event, observing an object related to the text topic (e.g., seeing a blue morpho butterfly in person), or watching a video of an event or person (e.g., viewing a video on the underground town of Coober Pedy). These interactions are considered stimulating activities that help students connect with what they are learning and increase their interest in a topic and the desire to learn more about it (Guthrie & Cox, 2001; Guthrie, Wigfield, & You, 2012).

Autonomy support. Autonomy support provides opportunities for students to have choices in the learning process (Guthrie & Cox, 2001). Being an autonomous learner stems from the self-determination theory (Ryan & Deci, 2009; Stefanou, Perencevich, DiCintio, & Turner, 2004). When teachers provide opportunities for students to be autonomous learners, students are given some control over their own learning, which increases motivation and engagement in reading (Guthrie, Wigfield, & You, 2012). Autonomy-supportive teachers respond to student-generated questions, create a student-centered environment, encourage student initiative and competence, provide a connection between learning material and students' personal goals, and work to support intrinsic motivation (Assor, Kaplan, & Roth, 2002; Stefanou et al., 2004). Additionally, allowing students a choice in what they read increases engagement in the reading process (Guthrie & McCann, 1997; Guthrie, Wigfield, Metsala, & Cox, 1999; Kamil et al., 2008). Giving students opportunities to choose what they read may lead to higher comprehension levels (Guthrie, Wigfield, & You, 2012) because students are likely to choose texts with topics they are familiar with, which will increase their interest levels and desire to read. Familiarity with a topic also means they bring more background knowledge to a reading task. The more background knowledge students

have, the higher their comprehension (Kendeou & van den Broek, 2007; McNamara & Kintsch, 1996). Allowing students a choice in tasks, texts, and evaluation empowers them and provides them a sense of independence, which increases their investment in the learning task (Guthrie & McCann, 1997).

Providing interesting texts. High-interest texts provide opportunities for students to connect with the topic they are reading about (Guthrie & Cox, 2001). When reading, text choice is crucial (Guthrie & Cox, 2001). Using high-interest texts has been linked to an increase in student engagement (Guthrie, Wigfield, & You, 2012). Interesting texts are those that connect to the established learning and knowledge goals (Guthrie & Cox, 2001) and allow students to not only find representatives of themselves but also to find topics about which they wish to learn (Biancarosa & Snow, 2004). High-interest texts increase the likelihood that students will start and continue to read a piece of text and help foster the reading skills and engagement of adolescent readers (Biancarosa & Snow, 2004). Additionally, students may be more effortful when comprehending text if they are interested in the topic (Wigfield et al., 2008).

Providing relevance. Providing relevance allows students to better connect with the material that they are reading (Guthrie & Cox, 2001). Engagement has been linked to a student's ability to relate to the material presented (Guthrie, Wigfield, & Klauda, 2012; Hulleman & Harackiewicz, 2009). It is posited that reading strategies connecting the text to personal experiences encourage students to engage more fully in the reading activity. If students see how texts or activities relate to their personal experiences, they may become more curious and their engagement levels are likely to increase (Guthrie, Wigfield, & Klauda, 2012). Relating texts to students' personal experiences also

activates their background knowledge, which positively impacts their comprehension levels (Kendeou & van den Broek, 2007; McNamara & Kintsch, 1996). Kamil et al. (2008) recommended looking for opportunities to connect activities occurring outside the classroom with activities occurring inside the classroom. This requires teachers understanding what is important and interesting to their students and designing learning opportunities around these interests (Biancarosa & Snow, 2004). Lau (2009) found that when middle and high school students felt that instruction related to their lives, their engagement in the reading activity was high.

Strategy instruction. Strategy instruction helps students increase their confidence and self-perception in reading (Guthrie & Davis, 2003) and has strong empirical support (Biancarosa & Snow, 2004; Kamil et al., 2008). Across research syntheses and research reviews, findings indicate several specific instructional practices that have evidence of positive impact (Biancarosa & Snow, 2004; Edmonds et al., 2009; Kamil et al., 2008, Scammacca et al., 2007; Watson, Gable, Gear, & Hughes, 2012). These research-based practices increase engagement because students have the skills necessary to attack a complex reading task. Strategies include comprehension monitoring, identifying the main idea, question generation, summarizing, theme identification, inference making, using fix-it strategies, and previewing text (Kamil et al., 2008). The more strategies students have, the more confident they are when reading, the more engaged they become, and the more they ultimately comprehend.

Collaboration support. Collaboration support allows opportunities for students to interact with each other to enhance their learning (Guthrie & Davis, 2003). Allowing students to discuss text with peers is another instructional practice utilized to increase

engagement (Guthrie, Wigfield, & You, 2012). Opportunities to work with peers is intrinsically motivating (Guthrie & Davis, 2003; Steinberg et al., 1997). For full engagement, students should not just discuss a topic, but they should interact with each other around a text (Biancarosa & Snow, 2004). Through collaboration, students are able to connect with peers, see different perspectives, and socially construct knowledge from text (Guthrie & Cox, 2001; Guthrie, Wigfield, & You, 2012). This interactive reading allows students to construct a deeper understanding of the text (Chi, 2009; King, 2002).

Praise and rewards. Praise and rewards provide feedback to students that ultimately impacts their motivation to read (Brophy, 1981; Guthrie, Wigfield, & You, 2012). Feedback is any information, positive or negative, that is provided by a teacher, classmate, parent, self, or experience (Hattie & Timperley, 2007). Immediate and specific feedback has evidence of positive impact (Hattie and Timperley, 2007). When students are provided feedback regarding their progress, improvement, and mastery of skills or content, they are more motivated to continue working hard, thus promoting engagement and ultimately comprehension (Guthrie, Wigfield, & You, 2012).

Student evaluation. Evaluation refers to "the use of teaching practices for judging student work that are compatible with the learning goals of the teacher and students" (Guthrie & Cox, 2001, p. 294). Evaluation should target students' personal progress rather than their progress in comparison to their peers. This increases their likelihood of focusing on the task rather than their abilities (Rosenholtz & Simpson, 1984). Additionally, evaluation should focus on the learning and knowledge goals that students should attain (Guthrie & Cox, 2001). Evaluation can provide students

meaningful information that can support their motivation and engagement in reading (Guthrie, Wigfield, & You, 2012).

Technology. Technology helps teachers create and present content and instruction that is interesting to students, which helps students become more actively engaged in the learning process (Edwards, 2013). Technology allows material to be made more relevant and personalized, which enhances student engagement and drives student achievement (Edwards, 2013). Russell et al. (2004) found that classes where the student to computer ratio was 1:1 had significantly higher levels of student engagement than shared classrooms. Specifically, student engagement increases when computers are used as a tool but are not the central learning modality, when students are allowed to explore rather than complete drill-and-practice, when computer experiences are individualized to students' interests and abilities, and when students are given a choice in how they utilize technology (Sanholtz, Ringstaff, & Dwyer, 1997).

Reading Comprehension Interventions With Engagement-Enhancing Components

Because empirically supported engagement-building practices are available, numerous reading comprehension interventions have been designed with specific components meant to target student engagement (Guthrie et al., 2012; Vaughn, Klingner, et al., 2011). One such intervention with engagement-building components is Collaborative Strategic Reading (CSR; Vaughn, Klingner, et al., 2011). The CSR intervention includes strategies used before, during, and after reading, with the ultimate goal being to increase student engagement with text and ultimately comprehension outcomes. Engagement-enhancing CSR strategies include previewing text, using fix-it strategies, generating questions, and summarizing (Vaughn, Klingner, et al., 2011).

Additionally, Concept-Oriented Reading Instruction (CORI; Guthrie, McRae, & Klauda, 2007) is another intervention with specific components included to increase student engagement. CORI is based on the premise that if students are highly engaged in reading, they use more reading strategies, are more motivated to read, and better comprehend what they read (Wigfield et al., 2008). In CORI, students' engagement levels are supported through the use of five activities: (a) using content goals in conceptual themes, (b) providing choices and autonomy to students, (c) providing hands-on activities, (d) using high-interest texts, and (e) allowing for student collaboration (Wigfield et al., 2008). Researchers theorized that by including these practices in the classroom, students' engagement would increase, which would positively impact their reading achievement.

Dimensions of Engagement

Because many reading comprehension interventions include specific components targeting student engagement, it is important to measure this student engagement within the context of the intervention and to understand which dimensions (i.e., cognitive, affective, behavioral, academic) of engagement are being measured.

Cognitive engagement. Cognitive engagement is an investment in learning, the ability to self-regulate, and the ability to be strategic (Fredricks et al., 2004). A student who is cognitively engaged has an investment in his/her own learning, has a desire to go above and beyond what is asked of him or her, and is not opposed to taking on a challenge (Fredricks et al., 2004; Newmann, Wehlage, & Lamborn, 1992). When cognitively engaged, students are strategic in how they approach a new task and are able to self-regulate their learning. Metacognitive strategies include students' planning,

monitoring, and evaluating their own learning (Pintrich & De Groot, 1990). Using these strategies to gain a deeper understanding of material is one indicator of high cognitive engagement (Fredricks et al., 2004). When reading, students are cognitively engaged if they monitor their comprehension, go back and fix their understanding when comprehension is impeded, ask and answer questions to check their understanding, make predictions and inferences, and connect new information learned with what they already know (Guthrie, Wigfield, & You, 2012; Kamil et al., 2008; Watson et al., 2012).

Affective engagement. Affective or emotional engagement refers to one's reactions in the classroom, which includes their boredom, happiness, sadness, and/or anxiety (Connell & Wellborn, 1991; Skinner & Belmont, 1993). Students who are engaged emotionally have a sense of identification with school and a feeling of belonging (Willms, 2003). Students have various reactions to school, activities, teachers, and peers, which may be negative or positive (Lee, 2014). Students may like or dislike school or peers, or be interested or bored with tasks depending on their affective engagement. If students have positive reactions to school and people, they will have stronger feelings of belonging. When students feel like they belong or are valued, they are more likely to engage in the learning process, which ultimately leads to higher outcomes (Lee, 2014). In the area of reading, students tend to be more emotionally engaged if they are afforded choice and are provided opportunities to discuss text with peers in a supportive and safe environment (Flowerday & Schraw, 2003; Marks, 2000).

Behavioral engagement. Behavioral engagement is the involvement in learning that refers to the effort, persistence, and concentration toward academic tasks (Birch & Ladd, 1997; Skinner & Belmont, 1993). Students who are behaviorally engaged follow

rules, behave appropriately, and observe classroom norms (Finn, 1989; Finn & Rock, 1997). Additionally, students who have high levels of behavioral engagement are effortful and persistent, and actively involved in their learning (Guthrie, Wigfield, & You, 2012). A subtype of behavioral engagement is academic engagement, which includes being on task and participating in academic tasks (Reschly & Christenson, 2012). Behavioral engagement is an important contributor to positive outcomes such as reading comprehension, since students who are behaviorally engaged are more motivated to read, put more effort into the reading task, and know how to construct meaning from text (Fredricks & McColskey, 2012; Guthrie et al., 2012). In the model of engagement proposed by Guthrie, Wigfield, and You (2012), the type of engagement that directly and indirectly impacts reading comprehension is behavioral engagement and is measured by students' reports of their efforts and persistence and the amount of time spent reading.

Measuring Student Engagement

Understanding the dimensions of engagement most commonly measured is important, but it is also necessary to gain an understanding of the ways in which these dimensions are measured within the context of a reading intervention. Five main methods for measuring engagement are commonly used. They are (a) student self-report, (b) experience sampling, (c) teacher ratings of students, (d) interviews, and (e) observations.

Student self-report. Student survey measures are the most common method for assessing student engagement. Students are usually provided items targeting various aspects of engagement and are asked to select the response that best describes them (Fredricks & McColskey, 2012). While many self-report measures are not subject

specific, there are some that assess engagement in a particular subject area, such as reading (Wigfield et al., 2008). Using self-report methods is a critical component of data collection since there are dimensions of engagement that are not easily observed (e.g., emotional engagement, cognitive engagement). Appleton, Christenson, Kim, and Reschly (2006) suggested that emotional and cognitive engagement should only be assessed using self-report measures because other types of measurement methods (e.g., observation, teacher rating) are not as accurate because they are too inferential. The self-report method of measurement is easy to administer in whole group settings and can be given to large and diverse samples of students (Fredricks & McColskey, 2012). While a limitation of this method is that students may not answer honestly when reporting on their behaviors, it is one of the only ways to measure cognitive and emotional engagement (Fredricks & McColskey, 2012).

Experience sampling (ESM). In experience sampling, students carry an electronic pager or alarm watch for a certain time period. When students receive the ESM signal, they complete a questionnaire, which includes items related to their location, activities, and cognitive or emotional engagement levels (Hektner, Schmidt, & Csikszentmihalyi, 2007). The benefit of this method is that engagement data can be collected in the moment rather than after a longer period of time where the memories of engagement levels may have faded (Fredricks & McColskey, 2012). The ESM method grew from the idea that when individuals are highly engaged, their awareness of time and space decreases. The signals provided by the pager or alarm watch remind individuals to stop and report on their engagement levels (Csikszentmihalyi & Larson, 1987). Additionally, this method looks at the change in engagement over time and across

activities (Fredricks & McColskey, 2012). Despite these strengths, the ESM method requires a large investment by participating individuals and may not capture the different dimensions of engagement (Fredricks & McColskey, 2012).

Teacher ratings of students. Teacher ratings of student engagement offer a different perspective on engagement. This method can be used to measure behavioral engagement, emotional engagement, and cognitive engagement (Skinner & Belmont, 1993; Wigfield et al., 2008). For younger students, teacher ratings of student engagement are beneficial because students may have a harder time assessing their own engagement and may have difficulty reading the actual questions due to limited literacy skills (Fredricks & McColskey, 2012).

Interviews. Although limited, some studies have used interviews to assess student engagement (Blumenfeld et al., 2005; Conchas, 2001). Interviews can be either structured or semi-structured, with questions that allow for more elaboration in student responses (Fredricks & McColskey, 2012). Not only can engagement levels be garnered from interviews, but reasons for these engagement levels can also be provided. Interviews provide more insight into why some students engage more than others (Fredricks & McColskey, 2012). While concerns about the reliability and validity of interviews exist, this method allows for more detail regarding students' experiences that most relate to engagement (Blumenfeld et al., 2005).

Observations. Observational methods, both individual and classroom, have been used to assess engagement (Lee & Anderson, 1993; Helme & Clarke, 2001; Volpe, DiPerna, Hintze, & Shapiro, 2005). In a study examining the impact of supplemental literacy courses for struggling ninth-grade readers, Somers et al. (2010) used observations

to measure treatment fidelity related to adherence, dosage, program differentiation, student participation, and quality. The observation method can provide detailed accounts of the factors related to context that lead to higher or lower levels of engagement (Fredricks & McColskey, 2012). Time on task, quality of instruction, and the presence of instructional practices linked to higher levels of engagement can be garnered from this method. While this method is labor and time intensive and may not be generalizable to other populations, it also provides rich insight into the role of engagement in the classroom setting that cannot be gained from other methods of measurement (Fredricks & McColskey, 2012).

Engagement Levels and Student Outcomes

Not only is including intervention components targeting engagement and measuring engagement important, but examining engagement in relation to outcomes is also crucial. Linking engagement directly or indirectly (e.g., mediation and moderation effects) is essential in order to fully understand the role engagement plays in reading comprehension (Guthrie et al., 2013).

In their experimental study of the impact of CORI on reading achievement, Wigfield et al. (2008) used the Reading Engagement Index (REI) and the Motivations for Reading Questionnaire (MSLQ) to measure teacher and student perceptions of engagement levels. They found that student engagement, as measured by the REI, was significantly correlated with reading comprehension, as measured by the Gates MacGinitie Reading Test (GMRT-4). Surprisingly, the MSLQ was not correlated significantly with comprehension outcomes. Additionally, they also found that students' engagement levels mediated the effects of instructional practices on comprehension

outcomes, indicating that engagement directly and indirectly impacts student reading achievement. Guthrie et al. (1999) found that students' self-reports of time spent reading in and out of school were related to students' reading comprehension outcomes, even when controlling for background knowledge, previous grades, intrinsic motivation, and self-efficacy. Additionally, they found that among 10th-graders, students' time spent reading, or their behavioral engagement, was positively correlated with reading achievement after controlling for past achievement, socioeconomic status, and self-efficacy. Wolters, Denton, York, and Francis (2013) examined group differences and the relation of motivation, which is positively related to engagement, to student outcomes for 406 students in Grades 7-12. They found that struggling readers reported lower levels of self-efficacy and thought that reading tasks were more difficult compared to students who were considered adequate readers. Finally, Jang (2008) looked at how providing a rationale for learning impacted student engagement and overall learning. One hundred thirty-six undergraduate students worked through the same 20-minute lesson after either receiving a rationale for learning or not receiving a rationale. Participants who received the rationale for learning had higher levels of reading comprehension than those who did not receive the rationale. This direct effect was mediated by students' behavioral engagement in the reading task.

With the well-established importance of student engagement in reading and the increased focus on increasing student engagement in reading, measuring engagement, and linking engagement to student outcomes, it is important to understand the role that engagement plays in reading outcomes.

Review of Student Engagement Research

To date, there have been limited reviews of student engagement research (Guthrie, Wigfield, & You, 2012; Fredricks et al., 2004; Fredricks et al., 2011; Guthrie & Humenick, 2004).

General overview. In their review, Fredricks et al. (2004) reviewed the definitions of engagement, the way each type can measured, the precursors to engagement, and the outcomes of it. Additionally, they discussed limitations in the research and areas in need of more research. They found that while much has been learned about student engagement, the full contribution of the multi-dimensional construct has not been realized.

Measurement. In 2011, Fredricks et al. conducted a systematic literature review to identify and describe the measures available to document engagement and the characteristics of each so that they are more accessible to researchers and practitioners. In all, they found 21 instruments to measure engagement in upper elementary school through high school. The measures included 13 student self-report instruments, three teacher reports, and four observational measures.

Engagement-building components and student outcomes. Two reviews looked at studies that examined direct and indirect relationships between motivation, engagement, classroom practices, and reading competence. Guthrie, Wigfield, and You (2012) reviewed a variety of experimental and correlation studies and found empirical support for their model of reading engagement previously discussed. Additionally, in a meta-analysis conducted by Guthrie and Humenick (2004), 131 effect sizes between experimental and control conditions were calculated from 22 studies that specifically

manipulated several aspects of intrinsic motivation support for reading and found that including content goals for instruction, providing autonomy support, using interesting texts, and allowing for collaboration increased student motivation and engagement.

Present Study

Given the relation of engagement to reading comprehension, it is important to understand the degree to which adolescent reading comprehension studies address engagement in their interventions and assessment procedures. The engagement literature has been reviewed in a small number of studies (Fredricks et al., 2004; Fredricks et al., 2011; Guthrie & Humenick, 2004); however, no studies have specifically examined the extent to which adolescent reading comprehension interventions include components believed to increase engagement, as well as the specific measurement procedures. The present study was designed to address this gap by examining adolescent reading comprehension intervention studies and the extent to which they have targeted and measured engagement. The guiding research questions included:

1. To what degree do reading comprehension interventions involving adolescents include components shown to increase student engagement? And which components were most prominently used?
2. What percentage of the studies measured engagement? And which dimensions of engagement were measured (e.g., cognitive, behavioral)?
3. What were the most common methods of measurement (e.g., student report, teacher report, observation)? And what specific engagement measures were used (e.g., Reading Engagement Index)?

4. What percentage of articles reported a relation between engagement and student outcomes? If engagement was statistically linked to student outcomes, were effect sizes significant?

Methods

A comprehensive search of adolescent reading comprehension interventions from the years 2000-2014 was conducted with the databases PsycInfo, Academic Search Premier, Social Sciences Full Text, ISI Web of Knowledge, ERIC, and Education Full Text (Wilson). Key search terms included *reading comprehension*, *reading intervention*, *reading comprehension intervention*, *adolescent reading comprehension*, *adolescent comprehension*, *comprehension*, and *secondary reading comprehension*. A Google Scholar search using the same terms was also conducted to locate any articles that may have been missed in the initial search. Additionally, the references of selected articles were examined. Finally, a hand search of the following journals was conducted: *Exceptional Children, Journal of Educational Research, Journal of Educational Psychology, Journal of Learning Disabilities, Journal of Literacy Research, Journal of Research on Reading, Learning Disabilities Research and Practice, Reading & Writing Quarterly, Reading and Writing: An Interdisciplinary Journal, Reading Research Quarterly, Remedial and Special Education, School Psychology Review, Scientific Studies of Reading,* and *The Journal of Special Education.*

This search resulted in 5,170 studies. A title and abstract search of these articles was then conducted. From this search, 4,948 were excluded and 222 studies were included in the full-text search. These studies were then evaluated using the following criteria: (a) must be published in a peer-reviewed journal; (b) must be published between

2000-2014; (c) must be conducted in sixth through 12th grades; (d) must be an experimental or quasi-experimental reading comprehension intervention; (e) must be printed in English; and (f) must include at least one standardized or researcher-developed comprehension outcome measure. Each of the 222 articles was screened by the researcher, and a double screening of each of these articles was conducted by a Ph.D. in special education and a second-year doctoral student in school psychology. Interrater reliability (IRR) was determined by dividing the number of exact agreements by the total number of agreements and disagreements and multiplying by 100; the IRR was determined to be 95%. For rating disagreements, both raters discussed each disagreement until a consensus was reached. This search resulted in 76 articles that were coded for the quality of engagement reporting. Four of the articles included two studies; therefore, 80 studies were actually coded. Figure 1 provides a flow diagram of the selection procedure.

Coding Procedures

A coding database was created using the Qualtrics survey program. Each study was coded for the following: (a) Does the intervention contain at least one component specifically targeting engagement? (b) Which components specifically target engagement? (c) Which strategies are used in the intervention? (d) Is student engagement measured? (e) Which dimensions of engagement are measured? (f) What method is used to measure engagement? (g) Is a commercial engagement measure used? (h) What other engagement measures are used? (i) Is student engagement statistically linked to student outcomes? (j) Which dimensions of engagement are linked to student outcomes? and (k) Are findings significant?

Interrater Reliability

The same two individuals who conducted the interrater reliability for the full-text screening also conducted the interrater reliability for the coding. Twenty-two percent (N = 18) of the articles were double coded. Interrater reliability was calculated by dividing the number of exact matches by the total number of exact matches and disagreements. This resulted in a reliability of 92%. For each of the 76 articles, reliabilities ranged from 86% to 100%.

Results

Engagement-Enhancing Intervention Components

Regarding the degree to which reading comprehension interventions for adolescents included practices to enhance student engagement, 76 (95%) of the 80 interventions included at least one component shown to increase student engagement (see Figure 2). The most common engagement-enhancing components utilized in adolescent reading comprehension interventions can be found in Figure 3.

Learning and knowledge goals. Of the 76 studies that included at least one practice that increases student engagement, 15 (19.7%) of the interventions included learning and knowledge goals. The most common practices were student- and teacher-developed goals and objectives for learning, the use of an overarching question, and the organization of learning activities around a theme.

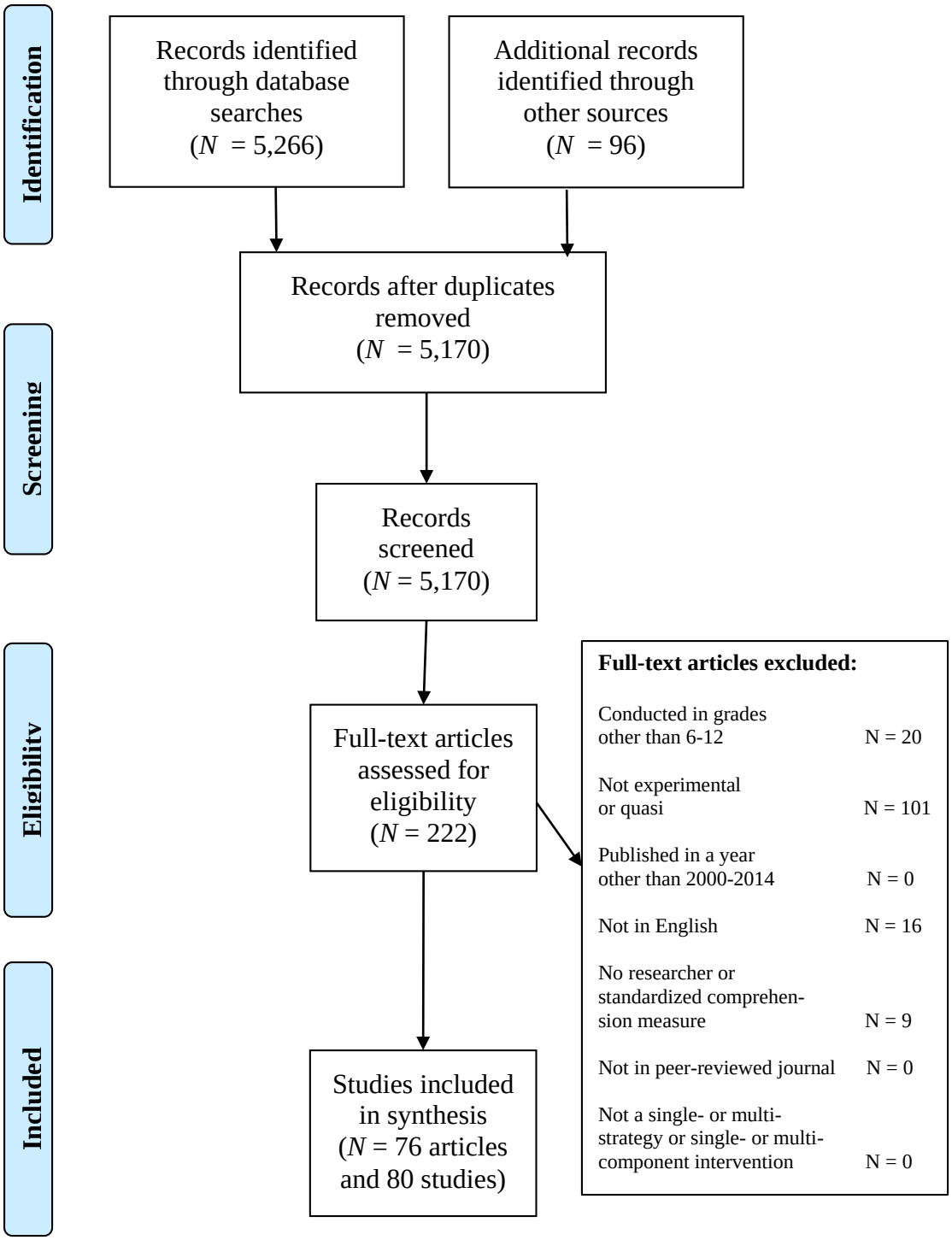


Figure 1. Flow diagram of articles selected.

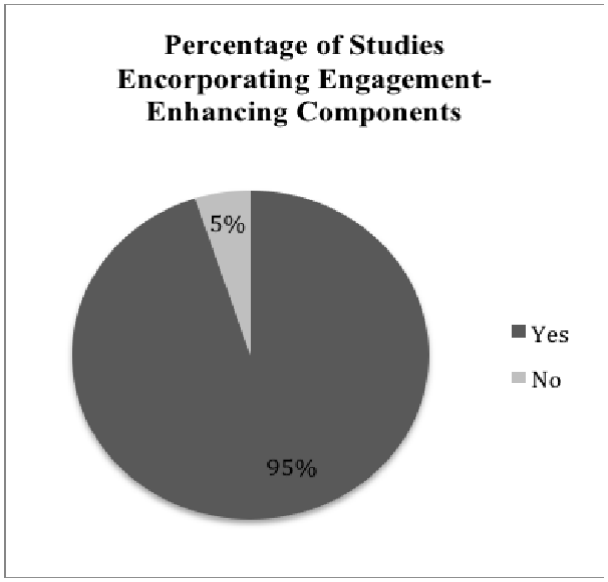


Figure 2. Percentage of studies including engagement-enhancing components.

Real-world interactions. Only two of the 76 studies (2.6%) included real-world interactions. In both of these interventions, students acted out portions of a narrative text. This was the least-used engagement-enhancing component.

Autonomy support. Of the 76 studies, 11 (14.4%) included a component allowing for student autonomy or independence. The most common autonomy support was students' choice of text. Additionally, students were afforded opportunities to select partners or teams, choose activities in a level to complete, and choose from options to demonstrate their learning.

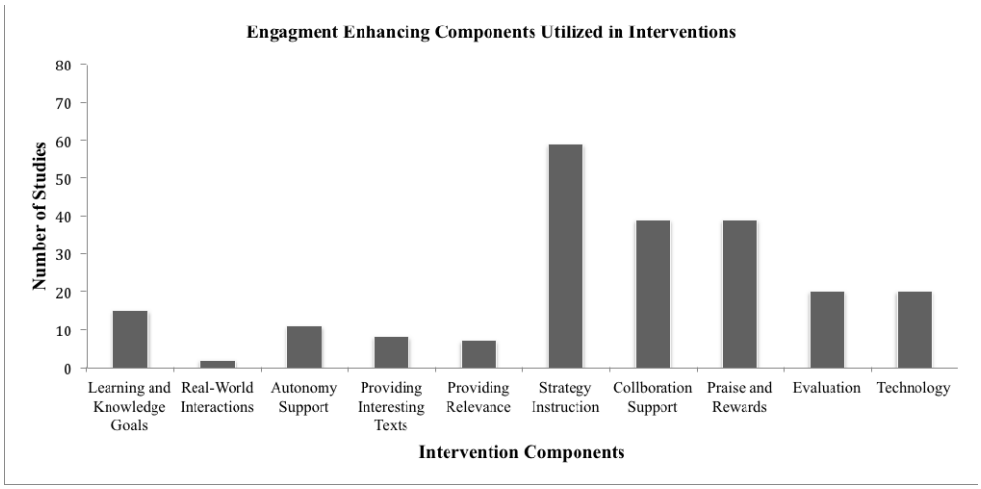


Figure 3. Engagement-enhancing components used in adolescent reading comprehension interventions.

Providing interesting texts. Eight of the 76 studies (10.5%) included the use of interesting texts. Texts in these studies were chosen because they had topics that were relevant to teens or were thought to be motivating.

Providing relevance. Seven of the 76 studies (9.2%) specifically provided relevance for students. Instruction was linked to issues that teens could relate to and/or their personal experiences.

Strategy instruction. Of the practices shown to increase student engagement, strategy instruction was utilized the most. Out of the 76 articles that included a practice shown to increase student engagement, 59 (77.6%) of the studies used some type of strategy instruction. The most common strategy was summarizing, which was found in 33 of the 59 interventions (55.9%). Comprehension monitoring was the second most commonly used strategy and was found in 27 interventions (56.7%), followed by background knowledge activation/building, which was found in 25 (42.4%) of the interventions. Graphic/text organizers were used in 20 (33.9%) of the interventions,

followed by question generation, question answering, making predictions, and text preview, which were each found in 18 (30.5%) of the interventions. Additionally, main idea identification was found in 17 (28.8%) of the interventions, and fix-it strategies and inference making were each utilized in nine (15.3%) of the interventions. Finally, text structure was used in eight (13.6%) of the interventions, visualization was used in three (5.1%) of the interventions, and theme identification was used in one (1.7%) of the interventions (see Figure 4). Thirty-eight (64.4%) of the 59 studies including strategy instruction were multi-strategy interventions and 21 (35.6%) were single strategy.

Collaboration support. Another common practice shown to increase student engagement was collaboration support, which was found in 39 of the 76 interventions (51.3%). Of these 39 studies, a small group was the most common collaboration support and was found in 23 of the studies (61.5%), followed by partners (n = 18, 46.2%), whole class (n = 20.5%), and medium group (n = 1, 2.6%). In some cases, multiple groupings were used in a given intervention.

Praise/rewards and feedback. Similar to collaboration support, 39 of the 76 studies (51.3%) included praise/rewards and feedback. The majority included teacher corrective feedback, and a small number included teacher praise and the use of rewards in the form of points.

Student evaluation. In 20 of the 76 studies (26.3%), student evaluation was used. Methods of evaluation varied, but were both formative and summative. Evaluation was targeted mainly at students' progress in a given intervention, and visual illustrations of this progress were frequently used (e.g., graph from one evaluation to the next).

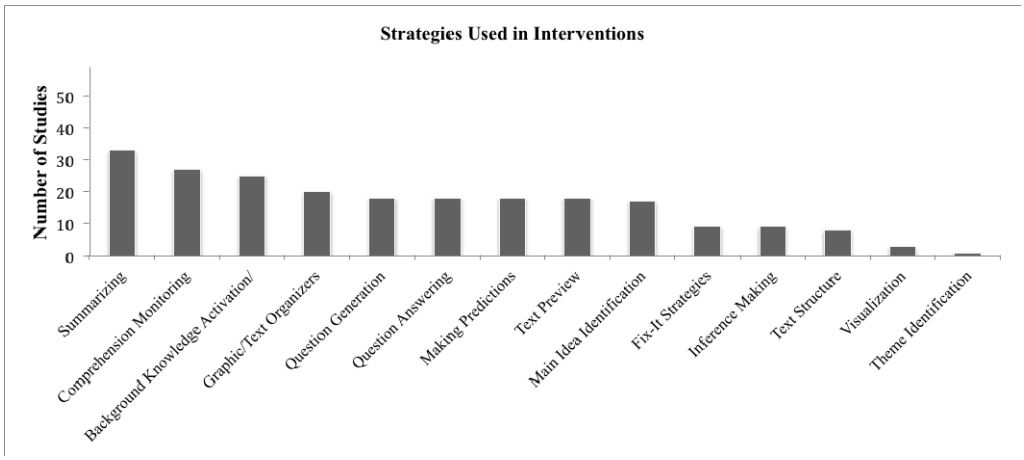


Figure 4. Strategies utilized in adolescent reading comprehension interventions.

Technology. Of the 76 studies, 20 (26.3%) included some form of technology. The majority of those 20 used computer delivered instruction, while a small number of studies used software programs or electronic slide presentations.

Other components. Two of the studies (2.6%) included components that the authors specifically said were included to enhance engagement. These included (a) emphasizing importance, and (b) encouragement by group leaders for students to read with more expression.

Measurement of Engagement and Dimensions Measured

In regards to the measurement of engagement, only seven of the 80 interventions (8.8%) measured engagement, meaning that 73 (91.3%) of the studies did not measure engagement (see Figure 5). Within those seven studies, behavioral engagement was measured in all seven studies (100%). Cognitive engagement was measured once (14.3%).

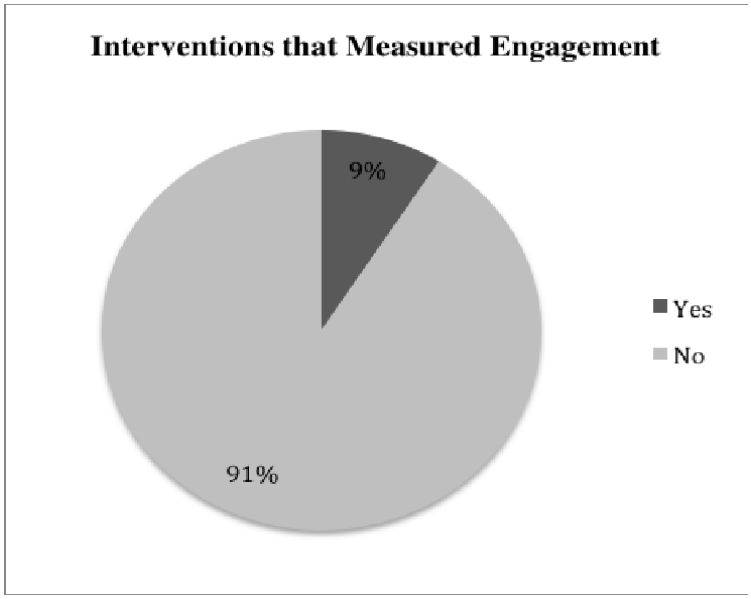


Figure 5. Percentage of adolescent reading comprehension interventions that measured student engagement.

Methods of Measurement and Specific Measures Used

Of the seven studies that measured engagement, the most common method of measurement was live observation, which was utilized in four of the seven studies (57.1%). Student self-report was used to measure engagement in two of the seven studies (28.6%), and one of the studies (14.3%) did not report how engagement was measured (see Figure 6).

Regarding the specific engagement measures used, three of the seven studies (42.9%) utilized a commercial measure. The three measures included the Classroom Assessment Scoring System (CLASS), the Metacomprehension Strategy Index and Reading Attribution Scale, and the Motivations for Reading Information Books in School measure. In the other four studies, one measured engagement using school attendance

and disciplinary actions, two used a Likert scale, and one did not report how it was measured.

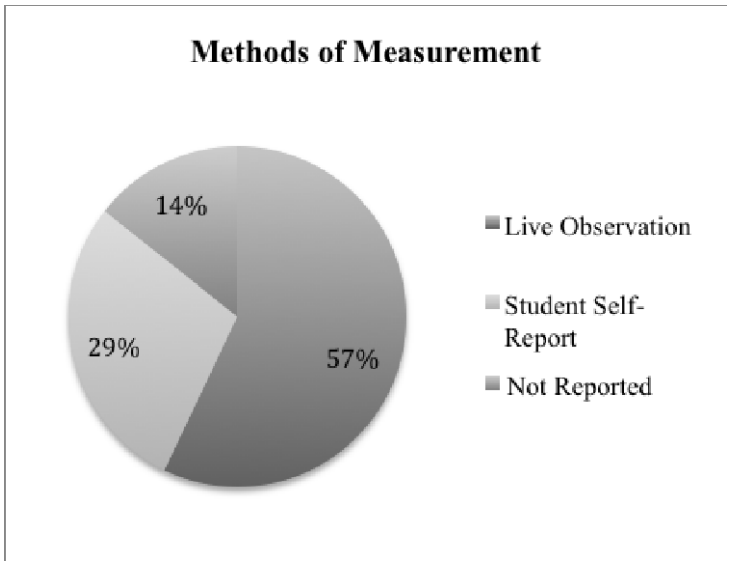


Figure 6. Methods of measuring engagement in adolescent reading comprehension interventions.

Engagement and Student Outcomes

Of the seven studies that measured engagement, only three (42.9%) statistically linked engagement to student outcomes. Behavioral engagement was used in all three and all were significantly related to student outcomes.

Discussion

Student engagement is considered an important and malleable construct that can be enhanced through instructional practices, and in particular practices that promote reading comprehension (e.g., strategy instruction, autonomy support, collaboration support). There is limited research, however, reviewing the role of student engagement in relation to reading comprehension interventions. In this review of literature, 76

articles (80 studies) were coded to determine the number of reading comprehension interventions that included engagement-enhancing components, the specific components included, whether or not engagement was measured, the most prominent methods of measurement, and whether engagement was statistically linked to student outcomes. Overall, findings indicated that many interventions incorporated engagement-enhancing components, yet limited attention was allocated to either the measurement of engagement, the types of engagement measured, or their relation to student outcomes. The following sections review and interpret primary findings and their implications for future engagement research and practice.

Did Studies Include Engagement-Enhancing Intervention Components and Which Were Most Prevalent?

A promising finding was that the majority (95%) of adolescent reading comprehension interventions published between the years 2000 and 2014 included at least one engagement-enhancing component. Methods used to enhance student engagement ranged from strategy instruction, was used in 77.6% of the studies, to real-world interactions, used in only 2.6% of the studies. Other components included providing interesting texts, collaboration, autonomy support, student evaluation, praise/rewards and feedback, technology, and providing relevance.

The most prevalent method used to promote reading engagement was strategy instruction. When students, especially struggling and disengaged readers, are explicitly taught to use reading strategies, they gain confidence that positively impacts their enthusiasm in the reading task (i.e., affective engagement), their willingness to be effortful and persistent, even when a reading task is challenging (i.e., behavioral

engagement), and they are able to self-regulate their reading and use fix-it strategies when comprehension is impeded (i.e., cognitive engagement) (Fredricks et al., 2004; Guthrie & Davis, 2003; Guthrie, Wigfield, & You, 2012; Reschly & Christenson, 2012). Numerous research syntheses show empirical support for explicit strategy instruction (Biancarosa & Snow, 2004; Edmonds et al., 2009; Kamil et al., 2008, Scammacca et al., 2007; Watson et al., 2012). Strategies provide students with a way to "engage" or interact with the text. The fact that the majority of adolescent reading comprehension interventions over the past 14 years included strategy instruction is promising, since students may have higher confidence when reading, which may engage them more in the reading process because they have the tools and a plan to navigate complex text.

Of the studies including strategy instruction, the majority (64.4%) used multiple strategies rather than just a single strategy. According to Kamil et al. (2008) and Edmonds et al. (2009), instruction in multiple strategies has a greater impact on students' comprehension than instruction in single strategies. The most common strategy utilized in the coded interventions was summarizing, which was a component in 55.9% of the interventions. Additionally, graphic/text organizers, question generation, and answering strategies were used in approximately 30% of the interventions. Visualization and theme identification were rarely incorporated.

Since the majority of these studies were multi-strategy interventions, it is difficult to know which specific reading comprehension strategies prompted engagement or how they impacted comprehension. Future research should examine specific strategies that most impact student engagement and comprehension so that multi-component

interventions can be even more effective. Prior research by Edmonds et al. (2009) has found multiple strategies effective but no definitive "best strategy" to use.

In addition, it is important to understand how strategies impact engagement. Current evidence does not determine whether strategies are promoting cognition or whether strategies are promoting academic engagement that ultimately permits cognition and comprehension. Additionally, given that Guthrie, Wigfield, and You's (2012) model of reading comprehension focuses on behavioral engagement only, it is necessary to examine other types of engagement (i.e., affective, cognitive) within the model to determine how they individually or collectively can be most effectively incorporated in interventions.

Did the Interventions Measure Engagement?

While engagement-enhancing components were used in many of the intervention studies, few studies examined how they influenced reading comprehension. In this study, only 9% of studies measured student engagement. If components are designed to promote engagement, we cannot fully attribute or explain the influence of these components until it is measured. One reason why few studies measured engagement may be because of the difficulties in defining and measuring engagement. With different types of engagement (i.e., cognitive, emotional, behavioral) requiring different methods of measurement (e.g., live observation, student self-report), it may be challenging for researchers to figure out how to measure these constructs reliably. Additionally, there is overlap in how these different types of engagement are defined, making it difficult to know what is actually being measured (Fredricks et al., 2004). Furthermore, in the area of reading comprehension, engagement in reading is often not easily observable, making

measurement challenging. Students may appear to be behaviorally engaged in reading because they are focused on the text in front of them, but whether they are cognitively engaged is difficult to determine. To increase the prevalence of engagement measurement, future research should continue to examine better ways to define and measure the various types of engagement. Perhaps qualitative methods, combined with the quantitative methods, will provide greater precision in how engagement varies across different individuals, contexts, and reading tasks, and how these variations connect (Fredricks et al., 2004).

Which Dimensions of Engagement Were Measured and How?

Dimensions measured. In the studies coded for this review, with the exception of one study that measured cognitive engagement, only behavioral engagement was measured (e.g., attendance and disciplinary reports). No studies measured affective engagement. Since behavioral engagement was the main focus of measurement in the interventions coded for this study, more research is needed to examine the role that cognitive and affective/emotional engagement plays in adolescent reading comprehension. The focus on behavioral engagement may be due to the fact that the Guthrie, Wigfield, and You (2012) model of reading comprehension focuses on behavioral engagement only. Perhaps the classroom practices they suggested impact behavioral engagement in reading may be different than those instructional practices or classroom conditions that impact cognitive and affective engagement. Fredricks et al. (2004) found that many studies measured one or two types of engagement (e.g., emotional and cognitive) but did not take all three into consideration. Understanding text is a complex process and requires a multitude of skills and strategies. In the area of

reading, the three types of engagement may not work in isolation. For example, in order to understand a piece of text, students may need to be behaviorally (e.g., be effortful and persistent), cognitively (e.g., deploy reading strategies), and emotionally (e.g., feel positively about the reading task) engaged. Simply being behaviorally engaged may not enable students to formulate a deep understanding of what they are reading. Future research should examine the effect of multiple classroom practices on multiple dimensions of engagement (i.e., cognitive, emotional, behavioral) since we do not yet have a full understanding of the coherent interaction of these contextual factors or how the different types of engagement interact with each other, specifically in the area of reading (Fredricks et al., 2004; Guthrie & Wigfield, 2000).

Methods of measurement. In the seven studies that measured engagement, only live observation and student self-report methods were used. It is not uncommon for studies to use teacher and student self-reports of student engagement, but this only gives a limited view about the contextual factors that influence engagement (Fredricks et al., 2004). To better understand how and why these contexts work, other methods of measurement should be used to formulate a more thorough description of these contexts. Future research should examine which methods or combination of methods best measure the different types of engagement (i.e., cognitive, behavioral, emotional). Furthermore, researchers should consider using multiple methods (e.g., qualitative and quantitative) to measure engagement as a way to gain a better understanding of how it impacts student achievement within the contexts of their interventions.

Did Studies Link Engagement to Student Outcomes and Were Results Significant?

While only three of the seven studies that measured engagement statistically linked engagement to student outcomes, all three found a significant relationship between engagement and comprehension outcomes. While only a few studies connected engagement to student outcomes, there is some empirical support that classroom practices and conditions can impact engagement and ultimately comprehension (Wigfield et al., 2008; Guthrie et al., 1999); therefore, researchers should consider not only measuring engagement but also statistically linking it to comprehension outcomes as a way to gain a thorough understanding of the extent to which certain variables are impacting comprehension. Perhaps the reason why a multi-component intervention works to increase comprehension levels is because students are more engaged in the reading task and willing to put in more effort, enthusiasm, and persistence into the process. This relationship can only be determined if engagement is measured.

Limitations

The findings of this review must be interpreted in the context of the following limitations. First, due to varying levels of specificity in intervention description, some components of the intervention may not have been coded. Therefore, findings may underestimate the actual engagement-enhancing practices used in interventions. Second, these conclusions are based on 80 studies of adolescent reading comprehension interventions. Though this is a respectable number of studies, there are a range of comprehension interventions and findings that may not generalize across all types of reading comprehension. In addition, there is the potential that some adolescent reading intervention articles were missed during the search. A further limitation is that this

review was restricted to published studies and consequently may not reflect the full range of studies that have been conducted examining engagement. Additionally, while only a small number of studies reported that they measured engagement, some studies could have measured engagement but not reported findings in the published article. Finally, I did not examine or code for theoretical underpinnings of studies (e.g., social constructivism) and how interventions aligned with different dimensions of engagement. Further research is needed to examine the alignment of theory and interventions to understand why and how they promote engagement.

Conclusions and Implications for Practice and Future Research

Current reading levels indicate that many adolescent students are not prepared to read and comprehend difficult texts (National Center for Education Statistics, 2012). One reason for these low reading levels is students' disengagement from text, and research supports the notion that students become increasingly disengaged from reading as they progress into middle and high school (Guthrie & Davis, 2003; Guthrie, Wigfield, & You, 2012). In theoretical models, reading engagement is identified as a variable that may influence reading achievement (Guthrie, Wigfield, & You, 2012).

Findings from this review provide evidence that engagement-enhancing components are commonly used in adolescent reading comprehension interventions, yet interventions rely on a small set of strategies. Only a small number of the studies examined the relation of engagement and student outcomes; nonetheless, there is some evidence that engagement positively impacts students' reading comprehension. To understand how practices impact outcomes, it is important to understand how practices promote engagement. Therefore, further research is needed that measures engagement

and its direct and indirect influence on reading comprehension. Reliably assessing engagement is challenging and more research is needed to understand how best to measure cognitive, behavioral, and affective engagement. While the majority of interventions included multiple engagement-enhancing components, few are measuring and/or reporting that engagement was measured and statistically linking engagement to student outcomes. There is limited but promising evidence of positive influence on outcomes. To better understand the role that engagement plays in student reading achievement, more research is needed to examine the classroom practices and conditions that impact student reading engagement, and more frequent measurement and connection to student outcomes is necessary to understand the extent that engagement influences student reading outcomes.

THE ROLE AND INTERACTIONS OF CLASSROOM PRACTICES, STUDENT ENGAGEMENT, AND READER CHARACTERISTICS ON READING COMPREHENSION

Reading with comprehension involves the active processing and construction of meaning to build a coherent representation of what the text says and what the text means (Guthrie, Wigfield, & You, 2012; Kintsch, 1998). At its core, constructing a comprehension model requires students to engage with text in many ways, such as persisting when the text is challenging, cognitively connecting ideas, and regulating or monitoring their understanding. Engagement, and its many dimensions, has been identified as a factor that explains, in part, the challenges of adolescents with text comprehension.

On the National Assessment of Educational Progress (National Center for Education Statistics, 2012), only 34% of eighth-graders and 38% of 12th-graders met reading proficiency standards. Current reading levels indicate many students are not prepared to read and comprehend difficult texts, which creates major barriers to success in higher education and the workforce (Carnegie Council on Advancing Adolescent Literacy, 2010). Fortunately, over the past decade, reading comprehension among adolescents has become a focus of researchers (Fogarty et al., 2014; Simmons et al., 2014; Vaughn, Swanson, et al., 2013). Models of reading comprehension such as the Simple View of Reading (Gough & Tunmer, 1986) and the Reading Systems Framework (Perfetti & Stafura, 2014) identify multiple processes and knowledge that influence or place limits on comprehension, yet these models may not fully explain differences among

readers of varying levels. Student engagement has been posited in theoretical models as a variable that may influence reading achievement (Guthrie, Wigfield, & You, 2012). Engagement has become an increasing focus of researchers, educators, and policymakers because it is considered important to addressing problems related to high levels of student boredom, alienation, dropout rates, and low achievement (Christenson, Reschly, & Wylie, 2012; National Research Council and Institute of Medicine, 2004).

Engagement in reading in particular is important because reading achievement greatly depends on and is predicted by how much time a person reads and how involved he or she is in the reading task (Guthrie et al., 1998; Wigfield & Guthrie, 1997). An engaged reader is strategic in how he or she approaches a reading task, is able to self-regulate his or her reading, and is invested in the reading task (Guthrie & Cox, 2001; Guthrie, Wigfield, & You, 2012). The role of student engagement to student success, particularly in reading comprehension, though intuitively logical is theoretically and methodologically complex. This study examined the relationship between classroom practices and conditions, behavioral and cognitive engagement, and comprehension outcomes of adolescent readers. In particular, it investigated whether these relationships varied when teachers implemented an experimental multi-component intervention or maintained their typical practices. Participants were middle-school teachers and their students, the majority of whom read below the 30th percentile on a measure of reading comprehension. The following sections review relevant literature to develop a theoretical and empirical rationale for examining student engagement with a focus on reading comprehension.

Literature Review

Theoretical Context: The Role and Dimensions of Student Engagement to Reading Comprehension

Student engagement is a multi-dimensional construct, and there are multiple models and dimensions of engagement that theoretically influence student achievement. Most agree that there are three dimensions of engagement, which are cognitive, affective, and behavioral. Additionally, there is a subtype of behavioral engagement identified as academic engagement (Reschly & Christenson, 2012). Cognitive engagement is students' investment in learning, which includes their ability to self-regulate their learning and be strategic and thoughtful. Students who are cognitively engaged in the reading process use strategies, use deliberate cognitive approaches, and connect what they already know to new information learned from a text (Guthrie et al., 2007). Affective or emotional engagement pertains to students' positive and negative reactions to school, teachers, and classmates, and to their identification with school. Students who are affectively engaged in the reading process show interest and enthusiasm in the reading experience (Guthrie, Wigfield, & You, 2012; Reyes, Brackett, Rivers, White, & Salovey, 2012). Behavioral engagement is the participation in academic, social, and extracurricular activities (Reschly & Christenson, 2012). Students who are behaviorally engaged in the reading process show high levels of effort and persistence and read both for pleasure and learning (Guthrie et al., 2007). A subtype of behavioral engagement is academic, which includes students' time on task, homework completion, and attendance (Fredricks & McColskey, 2012). Students who are academically engaged attend school regularly, complete homework on time, and are on task when in class.

In their model of reading engagement, Guthrie, Wigfield, and You (2012) posited that there is a relation between classroom practices and conditions and students' reading competence, which is mediated by students' behavioral engagement. In other words, classroom practices and conditions directly impact students' comprehension levels, but they also impact students' behavioral engagement, which ultimately influences their reading performance.

It has been empirically demonstrated that the Guthrie, Wigfield, and You (2012) model of reading comprehension (Guthrie et al., 2013; Wigfield et al., 2008) is valid and that classroom practices and conditions can impact engagement and ultimately comprehension, yet there are a limited number of studies that have examined the role of engagement to reading outcomes for adolescents (Anderson, in preparation). Thus, the purpose of this study was to build upon the model of engagement proposed by Guthrie, Wigfield, and You (2012) and examine the relationships between cognitive and behavioral engagement, classroom practices and conditions, students' entry-level reading skills, and reading comprehension for adolescent readers in the context of a multi-component reading comprehension intervention study. In particular, I was interested in the relation of these factors with adolescent readers, many of whom have significant reading difficulties, and whether the relations vary between treatment and business-as-usual conditions. The following sections will, based on the Guthrie, Wigfield, and You (2012) model, review the literature to summarize what is known about the role of (a) classroom practices and conditions shown to increase reading comprehension and student engagement, (b) student-level cognitive and behavioral engagement on comprehension, and (c) meditational and moderation effects of engagement to comprehension.

The Effect of Classroom Practice and Conditions on Reading Comprehension and Engagement

In the model of comprehension and engagement proposed by Guthrie, Wigfield, and You (2012), proposed that reading comprehension is impacted by specific classroom practices and conditions by either (a) directly impacting student comprehension, or (b) impacting students' engagement, which then improves comprehension. The logic behind this model is that classroom conditions (e.g., instructional quality, class climate, classroom management) foster high engagement that in turn fosters comprehension (Foorman & Schatschneider, 2003; Guthrie, Wigfield, & You, 2012). Classroom practices and conditions can encompass a variety of variables, but generally include "the characteristics of the classroom that are sufficiently powerful to impact variables for which educators are held accountable, such as achievement on major tests as well as experimental measures" (Guthrie, Wigfield, & You, 2012, p. 604). Examples of these classroom characteristics include teachers' instructional quality, teachers' affect, the class climate, and teachers' classroom management. One of the goals of the Guthrie, Wigfield, and You (2012) model was to examine and disentangle which classroom conditions and practices have direct or mediational effects on student engagement and reading comprehension. The next section will define specific instructional practices and review the literature on their impact on comprehension and student engagement.

Instructional quality. High-quality instruction is engaging, differentiated, standards-based, data driven, and research-based (Wisconsin RtI Center, 2014). Teachers who deliver high-quality instructional practice deliver instruction that overtly teaches

thought processes, emphasizes critical thinking, checks for student comprehension, and uses metacognitive strategies throughout instruction (Kemple et al., 2008).

Studies have documented the positive relationship between instructional quality and student outcomes (Foorman & Schatschneider, 2003; Foorman et al., 2006; Taylor, Pearson, Clark, & Walpole, 2000). Additionally, a range of instructional interventions designed to enhance the quality of instruction with adolescents have shown promising effects (Guthrie et al., 2013; Vaughn, Klingner et al., 2011; Wanzek, Vaughn, Roberts, & Fletcher, 2011). In their study of the relation of teacher quality to specific components and to reading achievement, Foorman et al. (2006) found moderate to high correlations between single-time quality rating scales and first grade students' comprehension outcomes (.62-.70), meaning that the higher the teachers were rated in their instructional quality, the higher students' comprehension levels tended to be. Additionally, they also found small to moderate correlations (.18-.41) between teachers' instructional quality and second-grade students' comprehension levels. For adolescent students, Vaughn, Klingner, et al. (2011) found that when seventh-graders received a multi-component reading intervention that incorporated many dimensions of high-quality instruction (e.g., explicit vocabulary instruction, activation of background knowledge, opportunities to respond), they performed significantly higher on a standardized comprehension measure than those who did not receive the instructional intervention.

Instructional quality has also been linked to students' engagement (Rimm-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009). A study by Rimm-Kaufman et al. (2009) found that kindergarten classrooms with high global instructional quality prompted high levels of behavioral engagement. Behavioral engagement included

successful completion of reading tasks, following rules, showing self-control, and remaining persistent through difficult tasks. The mechanism of high-quality instruction and student engagement on improving achievement is highly plausible in that good instruction is characterized by plentiful opportunities for students to participate, by sufficient opportunities for students to practice, and by overt examples of active comprehension to keep students engaged. Relatively few studies, however, have examined how the quality of instruction may be mediated by its influence on student engagement.

Teachers' affect. Teacher affect refers to being responsive to the individual cues and needs of students in a classroom. A teacher who has a positive affect is active, moves around the room, engages students, encourages participation, praises participation, interacts with students, and connects material to students' interests (Kemple et al., 2008). Negative teacher affect can have harmful effects on students' engagement and achievement. If a teacher devalues students, provides excessive negative feedback or embarrasses students, the students will begin to devalue their work and become disengaged with learning (Guthrie, Wigfield, & You, 2012; Strambler & Weinstein, 2010).

Teachers may also influence student engagement through interactions and personal affect (Guthrie, Wigfield, & You, 2012; Skinner et al., 2008; Skinner, Kindermann, & Furrer, 2009). Skinner et al. (2009) found that teachers who were warm, dependable, and knowledgeable had high levels of behavioral engagement in the classroom. Additionally, a more student-centered classroom is better for student engagement than a more teacher-centered and controlling classroom (Guthrie, Wigfield,

& Klauda, 2012). Skinner et al. (2008) found that the behavioral engagement (e.g., participation) of students in Grades 4-7 decreased as the levels of teacher support diminished. While negative teacher affect can decrease student motivation and engagement, practices that are affirming and positive can foster higher levels of engagement and text comprehension (Assor et al., 2002; Skinner & Belmont, 1993). Teacher support of students and a caring affect has been positively correlated with behavioral engagement, which includes higher levels of participation and on-task behavior (Ryan & Patrick, 2001).

Classroom climate. Classroom climate refers to the interactions that teachers and students have and the social processes within the classroom that promote student outcomes (Patrick, Ryan, & Kaplan, 2007). A positive class climate is one in which teachers are able to cultivate an emotionally supportive environment (Battistich, Schaps, & Wilson, 2004). The quality of interactions between and among students and teachers helps create a classroom climate; thus, a positive class climate is one in which teachers and students respect each other, are polite to each other, and have appropriate interactions with each other (Kemple et al., 2008).

It is postulated that students are more likely to achieve in school when they feel they belong, are valued, and when their needs related to competence and autonomy are met (Connell & Wellborn, 1991). In a study by Goodenow (1993), 353 students in sixth, seventh, and eighth grade self-reported on their classroom belonging and support, expectancies for success, and intrinsic interest and value. Additionally, grades for each student and English teacher ratings of effort were also collected. Results indicated that belonging/support factors significantly explained the variance in expectancies and value,

with teacher support being the most important influence across students. When students feel that their perspectives are valued and that they are supported, their achievement is likely to be higher than when they feel devalued (Pianta, Belsky, Vandergrift, Houts, & Morrison, 2008; Mashburn et al., 2008; Skinner & Belmont, 1993).

Class climate is also important since positive classroom environments are related to higher levels of emotional and behavioral engagement (Ladd, 1990). When teachers emphasize positive interpersonal relationships among students, students' reading motivation and engagement increases (Guthrie, Wigfield, & You, 2012). Positive student social interactions enhance students' willingness to participate in classroom activities, which increases their engagement in reading (Decker, Dona, & Christenson, 2007). In particular, Marks (2000) found that when students were in a classroom where students supported each other, there was higher engagement of students in elementary, middle, and high school grades. Additionally, Reyes et al. (2012) examined the link between classroom climate, academic achievement, and student engagement. Classroom observations, students' reports, and report card grades were collected on 1,399 fifth- and sixth-grade students, and Reyes et al. (2012) found that there was a positive relationship between class climate and grades that was mediated by students' engagement. A feeling of belonging in adolescence is correlated with emotional engagement (e.g., school satisfaction) and behavioral engagement (e.g., appropriate behavior, academic effort; Berndt & Keefe, 1995; Ladd, 1990); therefore, teachers should consider creating a classroom climate where there is respect, appropriate interactions, and where all students' opinions are valued.

Classroom management. Classroom management often includes teachers' ability to engage students and use class time effectively and efficiently (Pianta et al., 2012). Teachers who have effective classroom management maximize instructional time, provide clear and explicit teacher expectations, utilize clearly structured lessons, and provide learning experiences where students are able to practice, master, integrate, and generalize important skills (Kemple et al., 2008).

Effective classroom management has been linked to higher levels of student achievement (Doyle, 1986; MacGarity & Butts, 1984; Wang, Haertel, & Walberg, 1993). In two meta-analyses conducted by Wang et al. (1993) and Marzano and Pickering (2003), classroom management was found to be one of the most important factors that impacted achievement in school; thus, when teachers use class time effectively and efficiently, provide clear expectations, and have clearly structured lessons, students' achievement is likely to increase.

Additionally, a well-managed classroom can also create higher levels of engagement. When a teacher has good classroom management, he or she maximizes the amount of time available for instruction, manages student behavior by creating student expectations, has clear consequences when expectations are broken, and uses efficient classroom procedures that lead to high levels of behavioral engagement (e.g., higher amounts of time on task, fewer discipline problems; Doyle, 1986). In a study of middle and high school science students, MacGarity and Butts (1984) examined the relationship between teacher classroom management behavior, student engagement, and student achievement and found that there was a significant relationship among all variables. The particular management behaviors that were strongly related with achievement and

engagement included identifying students who did not understand directions and helping them individually, encouraging the efforts and involvement of students, using instructional time efficiently, providing feedback to learners, and managing disruptive behavior. High levels of classroom management positively impacts multiple dimensions of engagement (Fredricks et al., 2004); therefore, it is crucial that teachers work to successfully manage their classrooms.

The Impact of Cognitive and Behavioral Engagement on Comprehension

Guthrie, Wigfield, and You (2012) proposed that engagement mediates the direct effect of the classroom practice and conditions discussed above on reading competence. While they used behavioral engagement as the mediating variable, this study extended their model by looking not only at behavioral engagement as a mediator, but cognitive engagement as well. For this particular study, within the dimension of behavioral engagement, the indicator of effort and persistence was used. Under the cognitive engagement dimension, the self-regulation indicator was the focus.

Behavioral Engagement

Behavioral engagement is defined as the participation in academic, social, and extracurricular activities (Reschly & Christenson, 2012). High levels of behavioral engagement have been linked to increased student outcomes, reading achievement, and engagement (Guthrie, Wigfield, & You, 2012; Reschly & Christenson, 2012). Finn and Rock (1997) found that there were significant differences in behavioral engagement measures among adolescent students who were academically successful, not academically successful, and who dropped out of school. Additionally, when teachers rated students' behavioral engagement in first grade, those ratings significantly predicted

achievement over the next four years and also predicted high school completion (Alexander, Entwisle, & Horsey, 1997).

Guthrie, Wigfield, and You (2012) defined behavioral engagement in the area of reading as students' levels of effort and persistence when reading and time spent reading. Indicators of behavioral engagement specific to reading include students' report of effort and persistence, students' report of the amount of time spent reading, and teachers' observations of students' reading behaviors (Guthrie et al., 1999; Wigfield et al., 2008). For the purpose of this study, the indicator of effort and persistence was used to represent students' behavioral engagement through their self-report of their effort and persistence. Behavioral engagement can be measured through observational methods but can also be measured through teacher and student report methods (Fredricks et al., 2004). The indicators of behavioral engagement used in this study include students' self-reported engagement levels when a task is challenging, their persistence in understanding what the teacher is saying even when it does not make sense, their persistence in finishing work even when materials are uninteresting, and their effort to get good grades even when they are not fond of a class.

Effort and persistence. Students who are behaviorally engaged put forth high quantities of effort and are persistent when completing difficult tasks (Bandura, 1997; Schunk, 1991). In the area of reading, students' effort and persistence plays a crucial role in students' comprehension levels (Schunk, 2003). Providing students a choice, encouraging strategy use, assessing students and providing feedback, and goal setting can foster students' effort and persistence in reading and increase engagement and comprehension (Walker, 2003). When students are effortful and persistent and

successfully complete a reading task, it then increases their self-efficacy and engagement in the reading process. Allowing students a choice in their reading tasks or materials, develops their competence because they feel control over what they are doing in the classroom, which motivates them, increases their effort levels, and impacts their reading engagement (Turner, 1995; Walker, 2003). Additionally, if students receive positive feedback, they are more likely to continue to use these strategies, which increases the likelihood of being effortful and persistent on future reading tasks. Finally, when students have a purpose or goal for reading, their effort and persistence is likely to increase (Schunk, 2003). When junior high school students with learning disabilities were taught to set goals and make a study plan, they reported that the level of effort they put forth was the main reason for their success (Tollefson, Tracy, Johnsen, Farmer, & Buenning, 1984). Having a goal for reading may increase effort levels because students are more likely to persist to reach that goal.

Cognitive Engagement

Cognitive engagement is an investment in learning, which includes being thoughtful and strategic (Fredricks et al., 2004; Fredricks & McColskey, 2012). Students who are cognitively engaged think deeply about what they are learning, assess what they know and do not know, use different strategies to increase comprehension, and critically think about what they are reading (Linnenbrink & Pintrich, 2003). Prior research documented that comprehension strategy use can promote high levels of cognitive engagement that promote student achievement (Vaughn, Klingner et al., 2011, Vaughn, Wexler, et al., 2012).

In the area of reading, students who are cognitively engaged reflect on their learning and regulate their learning. For example, when a student finishes a chapter in a textbook and generates questions to check understanding, he/she is engaged cognitively. Monitoring one's comprehension through self-questioning is one way to regulate one's learning. If a student reader is unable to answer his or her own questions, then a cognitively engaged student reader uses a strategy to fix his or her understanding (Linnenbrink & Pintrich, 2003). For the purpose of this study, the indicator of self-regulation was used to represent students' cognitive engagement through their self-report of how they self-regulate their learning. Cognitive engagement can be measured through observational methods, but is most often measured through student self-report methods (Fredricks et al., 2004). On these measures, students are asked about their strategy use, whether they set goals, or how they monitor their thinking. The indicators of cognitive engagement used in this study include students' reports of whether they stop once in a while to go over what they have read, put important ideas into their own words when studying, think about the things will need to do to learn before studying, and ask themselves questions to make sure they understand.

Self-regulation. One indicator of cognitive engagement is students' ability to self-regulate their learning (Reschly & Christenson, 2012). Students with high levels of cognitive engagement, or self-regulation, are more thoughtful and strategic and are willing to exert the effort needed to understand complex ideas or difficult skills (Fredricks et al., 2004; Guthrie, Wigfield, & You, 2012).

According to Schunk and Zimmerman (2007), self-regulation in reading is essential because when students are actively engaged in their learning, they are more

likely to understand the text at a deeper level. Good self-regulators choose to participate in certain reading behaviors depending on their interest levels in tasks and their commitment to the activity. Schunk and Zimmerman posited that three phases of self-regulation (i.e., planning or forethought, performance control, and self-reflection) are evident in reading comprehension processes. In the planning or forethought phase, students use pre-reading strategies to prepare to read. These pre-reading activities may include previewing the author, title, and text features, setting checkpoints or stopping points, and activating background knowledge (Simmons et al., 2014). In the performance control phase, students self-regulate their reading by making inferences, monitoring their comprehension, summarizing, and generating and answering questions (Kamil et al., 2008). Finally, when readers are in the self-reflection phase they confirm that they fully understand what they have read and use the necessary strategies to form a coherent representation of the text. In short, good comprehenders are constantly taking in and updating their understanding of what the text says and what it means (Kintsch, 1998). Students who self-regulate reading are able to select reading strategies appropriate to the reading situation, evaluate whether or not the selected strategies helped them successfully reach their reading goal, and revise their strategy use if the goal was not met (Souvignier & Mokhlesgerami, 2006).

Examining Mediation and Moderation in Reading Comprehension

In their conceptual framework for engagement processes in reading, Guthrie, Wigfield, and You (2012) hypothesized that classroom practice and conditions, motivation, behavioral engagement, and achievement are all related, both directly and indirectly. Classroom practice and conditions directly impacts students' reading

competence (Path A) and students' dedication or behavioral engagement (e.g., self-regulation; Path B). They also theorized that there is a direct impact on students' motivations to read and reading competence (Path C). Additionally, they proposed that classroom practice and conditions directly impacts motivations to read (Path D), which directly influences behavioral engagement (Path E), which ultimately impacts reading achievement (Path F). Finally, they theorized that behavioral engagement indirectly influences, or mediates, the impact of classroom practice and conditions on reading competence (Path B/F). This path was the focus of the first research question in this study because it examined whether or not behavioral engagement mediated the relation of classroom practice and conditions to students' reading achievement. Additionally, the Guthrie, Wigfield, and You (2012) model was extended in this study since the mediation effect of cognitive engagement (i.e., self-regulation) was explored as well.

Guthrie, Wigfield, and You (2012) suggested that there is a paucity of research focusing on low achieving readers; therefore, examining struggling readers and the effects that engagement has on reading achievement is important. They explained that it is unclear whether the impacts of engagement on reading achievement are higher, lower, or the same for struggling readers in comparison to average or high-achieving readers. Supporting students' engagement may benefit this at-risk population (Quirk & Schwanenflugel, 2004), so it was important to examine whether the impact of behavioral and cognitive engagement on reading comprehension differed for students with lower, average, or higher initial reading skill levels. The second research question examined in this study was whether the relationship between engagement and comprehension varied

for students of different reading skills levels. The following section reviews the literature on mediation and moderation in relation to reading comprehension.

Engagement as a Mediator of the Effect of Classroom Practices and Conditions on Comprehension

One question addressed in this study was whether behavioral and cognitive engagement mediated the effect of classroom practices and conditions on reading comprehension. It has been posited that classroom practices impact engagement in reading, which ultimately affects students' reading comprehension (Guthrie, Wigfield, & You, 2012). In a study by Guthrie et al. (2013), the relationship between reading instruction, motivation, engagement, and achievement were modeled in both a traditional English language arts (ELA) classroom and a reading intervention classroom using CORI for 1,159 seventh-graders. They found that in the traditional ELA context, motivation directly impacted comprehension and indirectly impacted comprehension through engagement. Additionally, in the treatment condition, CORI was associated with positive changes in motivation, engagement, and achievement. Wigfield et al. (2008) examined CORI in relation to traditional instruction in fourth-grade classrooms and found that students who received the CORI intervention tested significantly higher than the control group in comprehension, reading strategies, and reading engagement. However, when engagement was controlled for, there were no significant differences between treatment and control, indicating that students' engagement in reading mediated the effect of classroom practices on comprehension outcomes.

Students' Initial Reading Skills as a Moderator of the Effect of Engagement on Comprehension

Another question examined in this study was whether students who struggle with reading differed from their higher-achieving counterparts with regard to the effect of behavioral and cognitive engagement on reading comprehension. Struggling readers may have very different experiences when reading than their higher-achieving peers; therefore, there may be different relationships between reading skill and engagement in reading. Klauda and Guthrie (2015) posited that while there is an assumption that engagement and achievement are related similarly for students at all reading levels, the connection between these constructs may actually differ for struggling and higher-achieving readers. One hypothesis they suggested is that the relationship between engagement and achievement would be stronger for struggling readers than higher-achieving readers. Struggling readers may experience repeated failure in reading activities, which may cause them to have lower self-efficacy (Klauda, Wigfield, & Cambria, 2012). This low self-efficacy may decrease their interest in the reading task, which ultimately impacts the effort they are willing to put forth (Klauda et al., 2012; Schunk & Zimmerman, 2007). Another hypothesis they suggested is that there potentially are no differences between students of different skill levels when it comes to the effect of engagement on comprehension outcomes.

While a few studies have examined differences in the relationship of reading motivation and comprehension between students of different proficiency levels (Saarnio, Oka, & Paris, 1990; Sideridis, Mouzaki, Simos, & Protopapas, 2006; Solheim, 2011), even fewer have included engagement (Klauda et al., 2012; Klauda & Guthrie, 2015).

Klauda et al. (2012) found that seventh-graders who were categorized as struggling or adequate readers differed in their self-efficacy and their perceived difficulty of a reading task. Additionally, in a study by Klauda and Guthrie (2015), advanced and struggling readers in the seventh grade completed measures of reading motivations, engagement, reading fluency, and comprehension. They found that advanced readers showed a stronger relationship of motivation and engagement with achievement than their struggling reader peers. However, motivation predicted growth in engagement similarly for both groups of readers.

Present Study

The purpose of this study was to extend the knowledge base on student engagement by examining (a) the extent to which classroom practices and conditions impacted students' behavioral and cognitive engagement and ultimately comprehension, and (b) how students' varying reading levels interacted with behavioral and cognitive engagement and comprehension within the context of a multi-component reading comprehension intervention study. To understand the influence of instructional context, I examined these factors in classrooms that had either been randomly assigned to a multi-component experimental reading comprehension intervention or to their business-as-usual instructional practices. The guiding research questions included:

1. To what extent is the effect of classroom practice and conditions (i.e., quality of instruction, classroom management, teacher affect, class climate) on reading comprehension mediated by the students' levels of cognitive and behavioral engagement in both the treatment and business-as-usual conditions?

2. Is the effect of behavioral and cognitive engagement (i.e., self-regulation, effort/persistence) on reading comprehension achievement moderated by students' initial reading skills (i.e., word reading and comprehension) in both the treatment and business-as-usual conditions?

Methods

Overview of Intervention

This study used a subsample (i.e., only those who completed the Motivated Strategies for Learning Questionnaire) of the 1,058 participants from a randomized controlled trial conducted during the 2012-2013 school year. This study examined the effect of multi-component reading comprehension intervention on 6th- through 10th-grade student reading outcomes (Simmons et al., 2014). The reading intervention, Comprehension Circuit Training (CCT), was designed to increase instructional practices through teacher-directed (i.e., vocabulary building, background knowledge, essential word identification) activities. It was further designed to increase student engagement and comprehension through student-regulated (i.e., comprehension monitoring, setting checkpoints, partner dialogue) practices. Practices were used with either narrative or expository texts and the time spent on each of the three components varied depending on the length and complexity of text. A common set of practices were used for both types of texts, but question types, graphic organizers, and assignments differed to reflect the various text structures and topics. Intervention implementation was intended for thirty-six 50-minute lessons dispersed over 12 weeks. In the business-as-usual condition, teachers were asked to maintain their typical instructional practices and were told not to include any of the components or materials from the intervention.

Participants and Setting

Schools. This study took place in three middle schools and two high schools from three districts in one state in the Southwest. The students educated in the three districts were diverse, with 79.9% economically disadvantaged and 21.3% limited English proficiency (LEP) in District A, 44.2% economically disadvantaged and 3.0% LEP in District B, and 77.6% economically disadvantaged and 16.8% LEP in District C.

Teachers. Seventeen female seventh- to 10th-grade English language arts teachers participated in this study. The experience of teachers ranged from 0 to 40 years with a mean of 12.57 years (SD = 13.37). All teachers held bachelor's degrees, three had master's degrees, and one had an educational specialist degree. Of the 17 teachers, 14 held English language arts certifications and seven held multiple certifications.

Students. Of the 1,058 students in the main study, only the students taking the Motivated Strategies for Learning Questionnaire were used for this study (N = 812). Descriptive student demographics by condition can be found in Table 1. Mean entry-level performance of students on the *Gates MacGinitie Reading Test, 4th Edition* (GMRT-4) was 92.69 (SD = 13.61) and mean entry-level performance on *The Test of Word Reading Efficiency–2nd ed.* (TOWRE-2) Sight Word Efficiency subtest was 100.23 (SD = 13.39).

Measures

As part of the larger project, participants completed a battery of instruments and tasks that included cognitive tasks, standardized assessments, researcher-developed measures, and self-report surveys. In the current study, we focused only on data from a subset of these measures as described below.

Table 1

Descriptive Student Demographics by Condition

	Intervention[a]		Comparison[b]	
Variable	*n*	%	*n*	%
Gender				
Male	205	49.8	214	54.3
Female	210	50.2	178	45.2
Ethnicity				
Asian	0	0.0	1	0.3
American Indian or Alaska Native	0	0.0	0	0.0
Black or African American	94	22.5	73	18.5
Hispanic or Latino	163	37.6	145	36.8
White	157	37.6	173	43.9
Identified for special education	24	5.5	23	6.1
Free or reduced-priced lunch	284	67.9	260	65.9
English language learner	37	8.9	27	6.9

Note. There were missing gender data for five students.
[a] N = 415.
[b] N = 392.

The Gates MacGinitie Reading Test, 4th Ed. (MacGinitie, MacGinitie, Maria, & Dreyer, 2010). To measure students' reading achievement, the GMRT-4 was used. This is a timed, group-administered assessment of reading comprehension. The comprehension subtest consisted of both expository and narrative passages, which ranged in length from three to 15 sentences. Students had 35 minutes to read each passage silently and then answer between three and six multiple-choice questions, which increased in difficulty. Internal consistency reliability ranges from .91 to .93; alternate-form reliability is reported as .80 to .83.

Motivated Strategies for Learning Questionnaire (MSLQ). To measure students' behavioral and cognitive engagement, a subset of questions from the MSLQ (Pintrich & De Groot, 1990) were adapted and used. The MSLQ is an inventory to measure the relationship between motivational and cognitive learning domains. It is a

self-report measure and includes 31 items about motivation, 31 items about learning strategies, and 19 items about student management of resources (Pintrich & De Groot, 1990). While some limitations of self-report measures have been suggested, Reschly and Christenson (2012) argued that students can accurately report on their experiences in schools, and these reports are often more accurate than reports by peers and teachers. Student perspective is crucial when understanding the role of engagement in learning (Reschly & Christenson, 2012). While the MSLQ is often used to measure students' motivation for learning, it has been used as an indicator of engagement as well (Pintrich & De Groot, 1990). On the MSLQ, respondents answer each statement using a Likert scale. If the statement is very true of the individual, a 7 is marked, and if the statement is not at all true of the individual, a 1 is marked. If the statement is more or less true of the individual, a number between 1 and 7 is marked. While the MSLQ is often used to measure motivation, there is a strong link between motivation, engagement, and reading achievement (Guthrie, Wigfield, & You, 2012). Students who are highly motivated are more engaged in their learning and often have higher achievement (Guthrie, Wigfield, & You, 2012). The MSLQ consists of statements that fall under either the motivation subscale or the cognitive subscale. Within the cognitive subscale, numerous questions target self-regulatory behavior (e.g., I ask myself questions to make sure I know the material I have been studying), which as mentioned above is an indicator of cognitive engagement (Reschly & Christenson, 2012). Additionally, numerous questions target effort and persistence (e.g., When work is hard, I either give up or study only the easy parts) which is an indicator of behavioral engagement (Guthrie, Wigfield, & You, 2012).

For this study, adapted questions from the MSLQ were used to measure students' behavioral and cognitive engagement.

Thirty-one statements from the MSLQ were modified to be more student friendly. These questions were categorized into 15 subscales (e.g., effort regulation, rehearsal, elaboration, organization, self-efficacy, metacognitive self-regulation) using the original MSLQ measure (Pintrich & De Groot, 1990). A second coder—a Ph.D. familiar with the MSLQ—categorized the same set of questions. There was 100% agreement on the categories in which the questions fell. Of the 31 questions, six subscales were represented. Four fell under elaboration, nine under metacognition self-regulation, one under organization, two under rehearsal, four under effort regulation, and five under self-efficacy. Six of the questions did not fall under any category. Since metacognitive self-regulation and effort regulation were the indicators of cognitive and behavioral engagement, only these questions were used in the analyses. Metacognitive self-regulation (nine questions) includes the awareness and control of the learning process, such as planning, monitoring, and regulating (e.g., When I'm reading, I stop once in a while and go over what I've read). Effort regulation (four questions) includes students' exertion of effort even when a task is difficult, and the ability to remain attentive even with uninteresting tasks (e.g., I always try to understand what the teacher is saying even if it doesn't make sense; Pintrich & De Groot, 1990). The categorized modified MSLQ questions are provided in Appendix B. Internal consistency reliability was acceptable for both the questions related to cognitive engagement and behavioral engagement at .91 and .77, respectively.

Classroom practice and conditions. Using a broad definition of classroom practice and conditions posited by Guthrie, Wigfield, and You (2012), global scores for teachers' overall instructional quality, classroom management, class climate, and teacher affect were used to represent the classroom practice and conditions variable.

A standardized observation measure was developed using previous research (Dane & Schneider, 1998; Kemple et al., 2008; Klingner, Urbach, Golos, Brownell, & Menon, 2010; Somers et al., 2010; Stanovich & Jordan, 1998) to observe and code classroom practice and conditions. The same observation was used in both conditions. For each observation, global quality scores were given for teachers' overall quality of instruction and overall classroom management. A scale of 1-5 was used, with 5 being the highest quality of instruction or classroom management, and 1 being the lowest quality of instruction or classroom management. Class climate and teacher affect were observed on a 1-3 scale (3 = high, 1 = low). The rubrics for each of these global indicators of instruction were obtained from Kemple et al. (2008).

Students' initial reading skills. To determine students' initial reading skills, students were categorized into three groups (i.e., no deficit, single deficit, multiple deficit) based on their initial reading skill levels in entry-level reading comprehension and word reading. To measure students' entry-level comprehension, the GMRT-4 passage comprehension subtest was used. To measure students' word reading, the TOWRE-2 (Torgesen, Wagner, & Rashotte, 1999) was used. The TOWRE-2 is a measure of an individual's ability to pronounce printed words (Sight Word Efficiency) accurately and fluently. The Sight Word Efficiency (SWE) subtest assesses the number

of real words printed in vertical lists that an individual can accurately read within 45 seconds. The alternate-form reliability ranges from .88-.95 (average of .91-.92).

Students in the multiple deficit group were those who fell below the 25th percentile on both entry-level comprehension and word reading, students in the single deficit group were those who scored below the 25th percentile on either entry-level comprehension or word reading, and students in the no deficit group were those who scored above the 25th percentile on both entry-level comprehension and word reading. In the treatment condition, 48 (11.5%) students were in the multiple deficit group, 87 (20.8%) were in the single deficit group, and 166 (55.1%) were in the no deficit group. In the business-as-usual condition, 43 (10.9%) were in the multiple deficit group, 97 (24.6%) were in the single deficit group, and 180 (45.7%) were in the no deficit group.

Fidelity and Interobserver Reliability

Teachers were observed approximately three times in their treatment classes and approximately three times in their business-as-usual classes. Classes were randomly selected, but teachers were notified prior to the observation. Reliability was calculated on 25% of fidelity observations. Agreement was determined using the kappa statistic, or observed agreement corrected for chance, in accordance with contemporary guidelines for reporting reliability (Cash, 2009). Kappa reliabilities for instructional quality, class climate, teacher affect, and classroom management were acceptable, at .73, .71, .72, and .71, respectively.

Data Analysis

First, confirmatory factor analysis was used to confirm the latent fidelity factors for behavioral engagement, cognitive engagement, and classroom practices and

conditions using M*plus* (Version 7; Muthén & Muthén, 1998-2012). Next, I tested the mediation model for both cognitive and behavioral engagement to determine whether the effect of classroom practices and conditions on reading comprehension was mediated by both cognitive and behavioral engagement. Finally, I tested the moderation models to determine whether students' initial reading skills, as measured by their initial comprehension and decoding levels, moderated the relation of behavioral and cognitive engagement to reading comprehension. I initially tested each mediation and moderation model in the full sample (i.e., treatment and business-as-usual) and then ran each model with the conditions separated.

The models were estimated using M*plus* (Version 7; Muthén & Muthén, 1998-2012) with maximum likelihood estimation method. The following indices were used to evaluate the goodness-of-fit of each model, including: chi-square test statistics, root mean square error of approximation (RMSEA), comparative fit index (CFI), and standardized root mean square residual (SRMR). Using Hu and Bentler's (1999) recommendations, the following cutoff values of the fit indices as the criteria for an acceptable fit model were used: (a) CFI equal or larger than .95, (b) RMSEA equal or smaller than .08, and (c) SRMR equal or smaller than .08.

Results

Descriptive Statistics

Means and standard deviations of the GMRT-4 pretest and posttest, TOWRE-2, MSLQ questions related to cognitive engagement, and MSLQ questions related to behavioral engagement are presented in Table 2 with a breakdown by reader type and

condition. Additionally, the means and standard deviations for the global indicators of instruction are presented in Table 3 by condition.

Latent Fidelity Factors

Single latent factors for behavioral engagement, cognitive engagement, and classroom practices and conditions (i.e., instructional quality, classroom management, class climate, teacher affect) were confirmed using confirmatory factor analysis. Fit indices indicated good fit for each latent variable, with $\chi^2(2) = 2.29$, $p = .317$, CFI = .999, SRMR = .011, RMSEA = .014 for behavioral engagement; $\chi^2(25) = 65.27$, $p < .001$, CFI = .973, SRMR = .029, RMSEA = .045 for cognitive engagement; and $\chi^2(2) = 33.50$, $p < .001$, CFI = .978, SRMR = .023, RMSEA = .160 for classroom practices and conditions.

Research Question 1: Mediation Model for Behavioral and Cognitive Engagement

Behavioral engagement (full sample). Regarding whether the effect of classroom practices and conditions on reading comprehension was mediated by students' behavioral engagement in the full sample, results indicated that there was partial mediation. The initial model tested all simple direct paths and the results showed that all the paths were significant, including: classroom practices and conditions predicting behavioral engagement ($\beta = .110$, $p = .007$), behavioral engagement predicting comprehension ($\beta = .267$, $p < .001$), and classroom practices and conditions predicting comprehension ($\beta = .144$, $p < .001$). The final model hypothesized a mediating effect of classroom practices and conditions on comprehension via behavioral engagement in which behavioral engagement was a mediator. The indirect effect of classroom practices and conditions predicting comprehension via behavioral engagement was significant ($\beta = .029$, $p = .046$), indicating that part of the total effect of classroom practices and

conditions on reading competence was mediated by behavioral engagement in the full sample, but the significant direct path from classroom practices and conditions on reading competence suggested only partial mediation. Fit indices indicated adequate model fit with $\chi^2(25) = 101.54$, $p = < .001$, CFI = .960, RMSEA = .061, and SRMR = .042).

Behavioral engagement (business-as-usual). Regarding whether the effect of classroom practices and conditions on reading comprehension was mediated by students' behavioral engagement in the business-as-usual condition, results indicated that there was no mediation (see Figure 7). The initial model tested all simple direct paths, and analyses revealed that only one of the paths was significant. Behavioral engagement predicting comprehension was significant ($\beta = .290$, $p < .001$), while classroom practices and conditions predicting behavioral engagement ($\beta = .029$, $p = .705$) and classroom practices and conditions predicting comprehension ($\beta = .002$, $p = .976$) were not significant. While I hypothesized a mediating effect of classroom practices and conditions on comprehension via behavioral engagement in which behavioral engagement is a mediator, the indirect effect was not significant ($\beta = .008$, $p = .706$), indicating that the effect of classroom practices and conditions on reading competence was not mediated by behavioral engagement in the business-as-usual group. Fit indices indicated good model fit with $\chi2(36) = 58.41$, $p < .001$, CFI = .957, RMSEA = .058, and SRMR = .058.

Table 2

Means and Standard Deviations on Measures by Reader Type and Condition

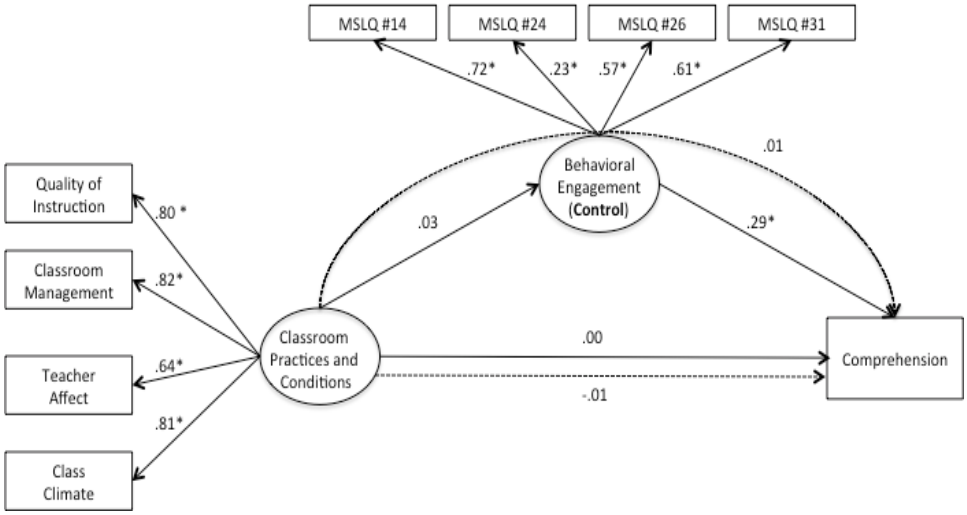
	No Deficit		Single Deficit		Multiple Deficit	
	Treatment	Control	Treatment	Control	Treatment	Control
Measure	Mean *(SD)*	Mean *(SD)*	Mean *(SD)*	Mean *(SD)*	Mean *(SD)*	Mean *(SD)*
GMRT-4 (Pretest)	103.93 (9.28)	103.29 (12.91)	91.39 (13.5)	87.08 (9.29)	77.60 (8.43)	77.61 (8.69)
GMRT-4 (Posttest)	102.33 (12.43)	103.29 (12.92)	91.39 (14.03)	86.78 (11.90)	78.64 (9.79)	79.60 (11.12)
TOWRE-2	107.86 (9.80)	107.87 (10.51)	93.78 (10.13)	96.89 (9.98)	82.17 (7.45)	83.07 (6.01)
MSLQ (Cognitive)	40.89 (8.85)	38.78 (8.79)	39.81 (9.42)	40.87 (9.72)	40.17 (10.34)	40.50 (10.15)
MSLQ (Behavioral)	20.44 (4.57)	20.76 (4.61)	19.26 (4.56)	19.29 (4.56)	17.47 (4.87)	18.21 (4.79)

Note. GMRT-4 = Gates MacGinitie Reading Test, TOWRE-2 = Test of Word Reading Efficiency, MSLQ = Motivated Strategies for Learning Questionnaire.

Table 3

Means and Standard Deviations on Global Indicators of Classroom Practices and Conditions by Condition

	Treatment	Business-As-Usual
Quality Indicator	Mean (SD)	Mean (SD)
Quality of Instruction (1=low, 5=high)	2.92 (.83)	2.74 (.73)
Classroom Management (1=low, 5=high)	3.36 (1.1)	3.13 (.86)
Classroom Climate (1=low, 3=high)	2.14 (.72)	2.32 (.45)
Teacher Affect (1=low, 3=high)	2.19 (.56)	2.08 (.40)

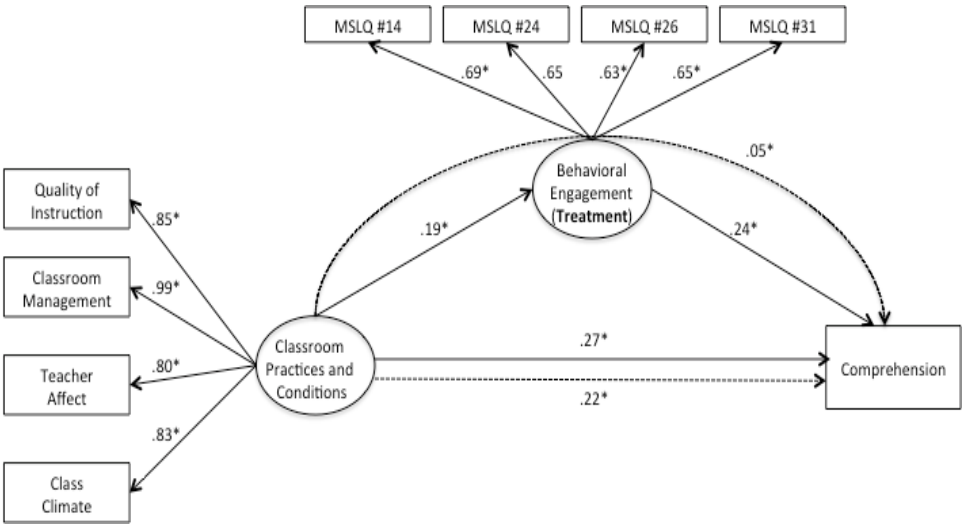


* Significance at the .01 level.

Figure 7. Mediation model for behavioral engagement in business-as-usual condition.

Behavioral engagement (treatment). Regarding whether the effect of classroom practices and conditions on reading comprehension was mediated by students' behavioral engagement in the treatment condition, results indicated that there was partial mediation

(see Figure 8). The initial model tested all simple direct paths, and the results showed that all the paths were significant, including: classroom practices and conditions predicting behavioral engagement (β = .193, *p* = .007), behavioral engagement predicting comprehension (β = .236, *p* < .001), and classroom practices and conditions predicting comprehension (β = .265, *p* < .001). The final model hypothesized a mediating effect of classroom practices and conditions on comprehension via behavioral engagement in which behavioral engagement was a mediator. The indirect effect of classroom practices and conditions predicting comprehension via behavioral engagement was significant (β = .046, *p* = .018), indicating that part of the total effect of classroom practices and conditions on reading competence was mediated by behavioral engagement in the treatment group, but the significant direct path from classroom practices and conditions on reading competence suggested only partial mediation in the treatment condition. Fit indices indicated adequate model fit, with $\chi^2(25) = 115.53$, *p* < .001, CFI = .931, RMSEA = .093, and SRMR = .047.



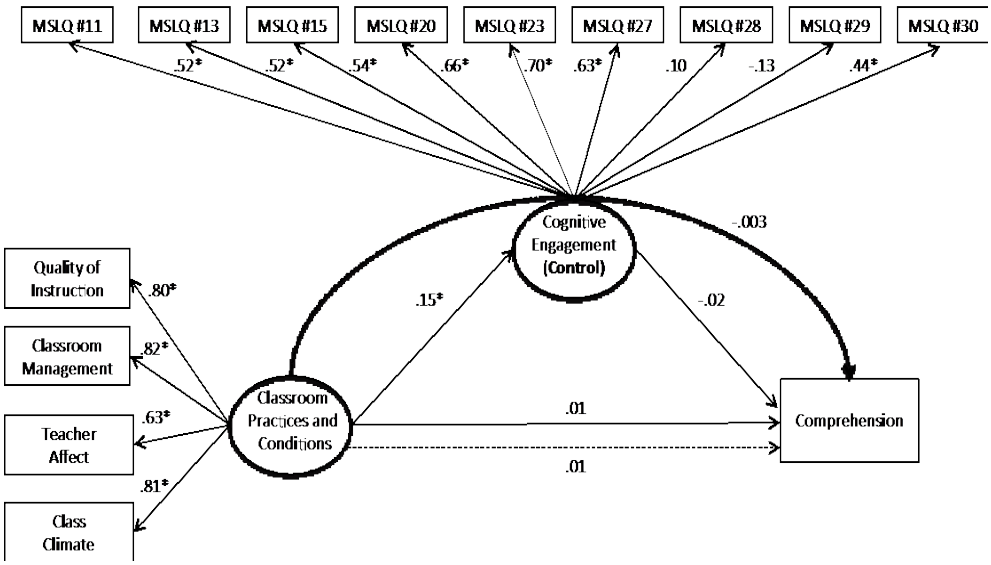
* Significance at the .01 level.

Figure 8. Mediation model for behavioral engagement in treatment condition.

Cognitive engagement (full sample). Regarding whether the effect of classroom practices and conditions on reading comprehension was mediated by students' cognitive engagement in the full sample, results indicated that there was no mediation. The initial model tested all simple direct paths, and the results showed that only two of the paths were significant. Classroom practices and conditions predicting cognitive engagement ($\beta = .117$, $p = .015$) and classroom practices and conditions predicting comprehension ($\beta = .173$, $p < .001$) were significant, while cognitive engagement predicting comprehension ($\beta = -.028$, $p = .499$) was not significant. Although I hypothesized a mediating effect of classroom practices and conditions on comprehension via cognitive engagement in which cognitive engagement is a mediator, the indirect effect of classroom practices and conditions predicting comprehension via cognitive engagement was not significant ($\beta = -.003$, $p = .523$) in the full sample. Fit indices indicated good model fit, with $\chi^2(73) = 213.20$, $p < .001$, CFI = .954, RMSEA = .049, and SRMR = .041.

Cognitive engagement (business-as-usual). Regarding whether the effect of classroom practices and conditions on reading comprehension was mediated by students' cognitive engagement in the business-as-usual condition, results indicated that there was no mediation (see Figure 9). The initial model tested all simple direct paths, and the results showed that only one of the paths was significant. Classroom practices and conditions predicting cognitive engagement was significant ($\beta = .151$, $p = .031$), while classroom practices and conditions predicting comprehension ($\beta = .010$, $p = .879$) and cognitive engagement predicting comprehension ($\beta = -.018$, $p = .769$) were not significant. Although I hypothesized a mediating effect of classroom practices and conditions on comprehension via cognitive engagement in which cognitive engagement

as a mediator, the indirect effect of engagement was not significant (β = -.003, *p* = .771) in the business-as-usual condition. Fit indices indicated adequate model fit, with $\chi^2(73)$ = 161.27, *p* < .001, CFI = .930, RMSEA = .055, and SRMR = .054.

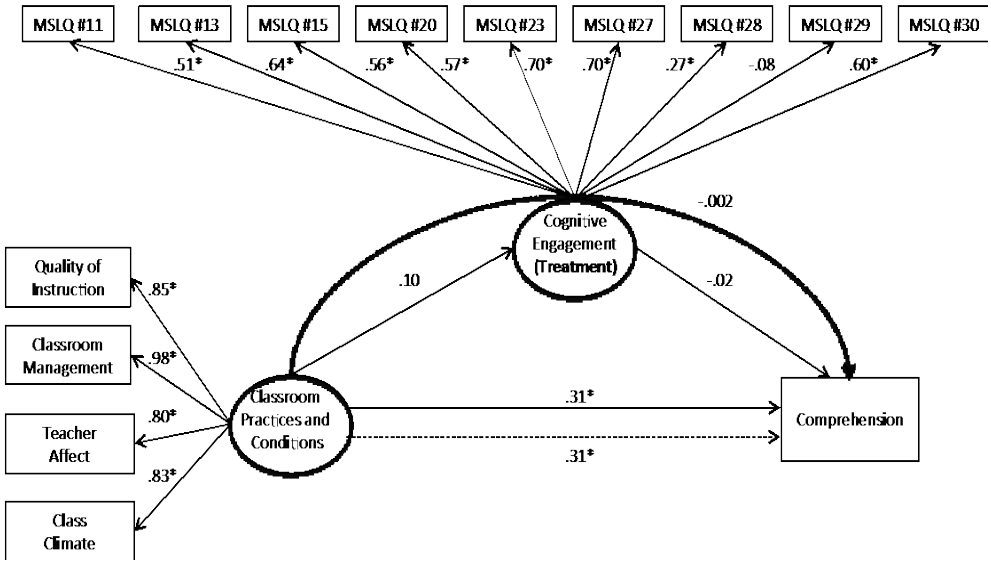


* Significance at the .01 level.

Figure 9. Mediation model for cognitive engagement in business-as-usual condition.

Cognitive engagement (treatment). Regarding whether the effect of classroom practices and conditions on reading comprehension was mediated by students' cognitive engagement in the treatment condition, results indicated that there was no mediation (see Figure 10). The initial model tested all simple direct paths, and the results showed that only one of the paths was significant. Classroom practices and conditions predicting comprehension was significant (β = .307, *p* < .001), while classroom practices and conditions predicting cognitive engagement (β = .101, *p* = .118) and cognitive engagement predicting comprehension (β = -.024, *p* = .664) were not significant. Although I hypothesized a mediating effect of classroom practices and conditions on

comprehension via cognitive engagement in which cognitive engagement is a mediator, the indirect effect of classroom practices and conditions predicting comprehension via cognitive engagement was not significant (β = -.002, *p* = .684) in the treatment condition. Fit indices indicated good model fit, with $\chi^2(73) = 173.15$, $p < .001$, CFI = .949, RMSEA = .057, and SRMR = .046.



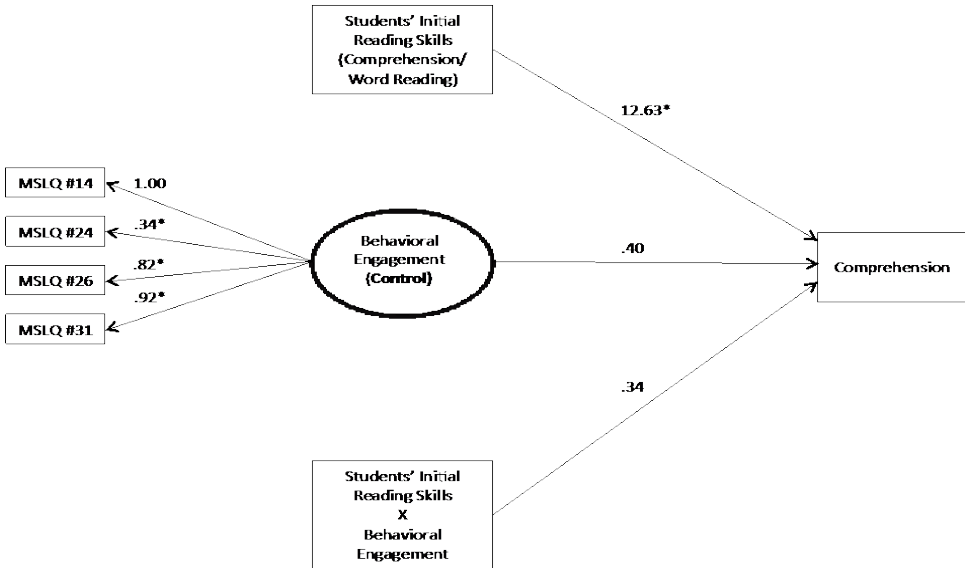
* Significance at the .01 level.

Figure 10. Mediation model for cognitive engagement in treatment condition.

Research Question 2: Students' Initial Reading Skills as Moderator

Behavioral engagement (full sample). Regarding whether the effect of behavioral engagement on reading comprehension was moderated by students' initial reading skills in the full sample, the analyses showed no interaction (b = .472, *p* =.428), indicating that the effect of behavioral engagement on reading competence did not differ at each of the three levels of initial reading skill in the full sample.

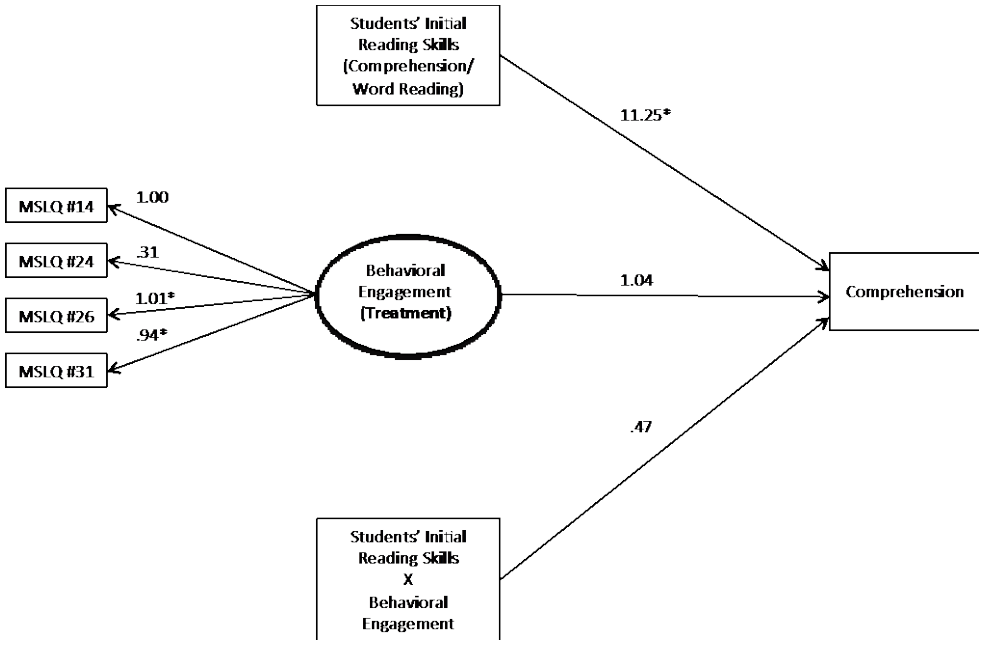
Behavioral engagement (business-as-usual). Regarding whether the effect of behavioral engagement on reading comprehension was moderated by students' initial reading skills in the business-as-usual condition, the analyses showed no interaction (b = .344, *p* =.691), indicating that the effect of behavioral engagement on reading competence did not differ at each of the three levels of initial reading skill in the business-as-usual condition (see Figure 11).



* Significance at the .01 level.

Figure 11. Moderation model for behavioral engagement in business-as-usual condition.

Behavioral engagement (treatment). Regarding whether the effect of behavioral engagement on reading comprehension was moderated by students' initial reading skills in the treatment condition, the analyses showed no indication of interaction (b = .486, *p* =.563), indicating that the effect of behavioral engagement on reading competence did not differ at each of the three levels of initial reading skills in the treatment condition (see Figure 12).

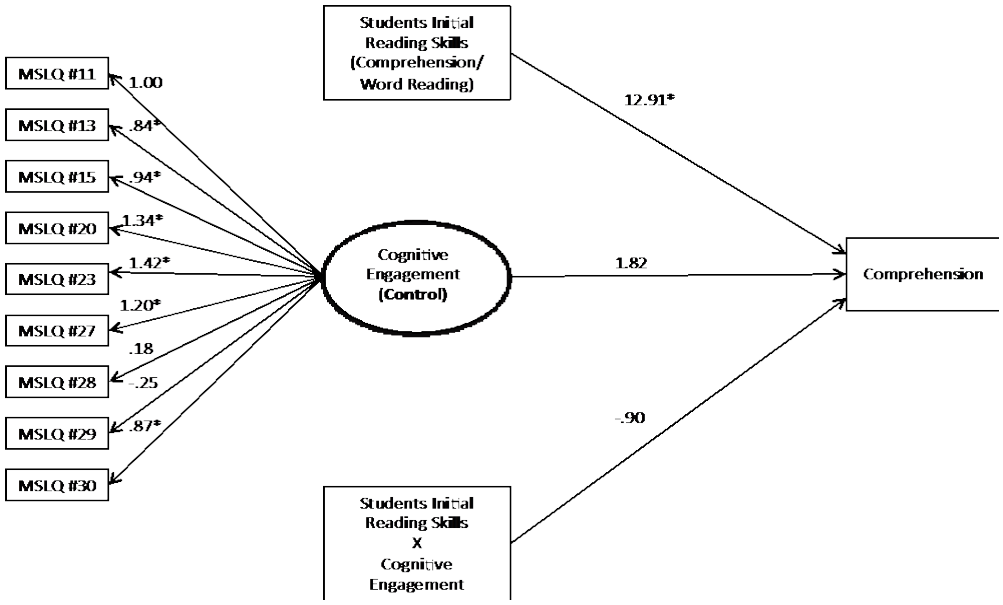


* Significance at the .01 level.

Figure 12. Moderation model for behavioral engagement in treatment condition.

Cognitive engagement (full sample). Regarding whether the effect of cognitive engagement on reading comprehension was moderated by students' initial reading skills in the full sample, the results showed no indication of interaction (b = -.344, *p* = .658), indicating that the effect of cognitive engagement on reading competence did not differ at each of three levels of initial reading skills in the full sample.

Cognitive engagement (business-as-usual). Regarding whether the effect of cognitive engagement on reading comprehension was moderated by students' initial reading skills in the business-as-usual condition, the results showed no indication of interaction (b = -.902, *p* = .359), indicating that the effect of cognitive engagement on reading competence did not differ at each of three levels of initial reading skills in the business-as-usual condition (see Figure 13).



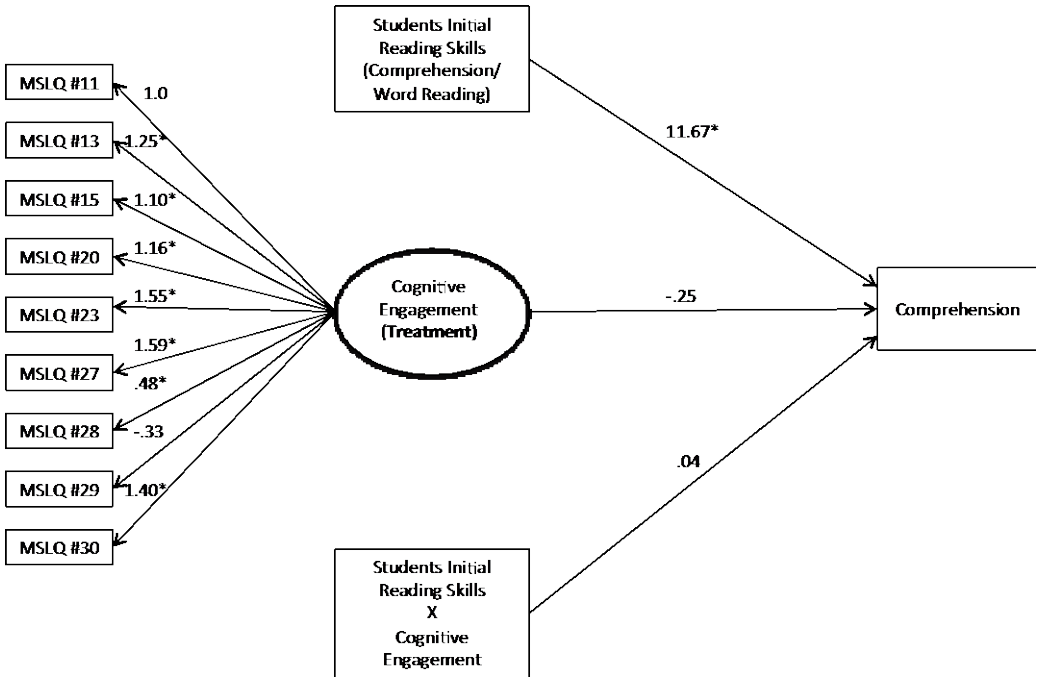
* Significance at the .01 level.

Figure 13. Moderation model for cognitive engagement in business-as-usual condition.

Cognitive engagement (treatment). Regarding whether the effect of cognitive engagement on reading comprehension was moderated by students' initial reading skills in the treatment condition, the analyses showed no indication of interaction (b = .041, *p* = .973), indicating that the effect of cognitive engagement on reading competence did not differ at each of the three levels of initial reading skills in the treatment condition (see Figure 14).

Discussion

The aim of this study was to examine various paths from the Guthrie, Wigfield, and You (2012) reading comprehension model and to determine whether adolescents' behavioral (i.e., effort and persistence) and cognitive (i.e., self-regulation) engagement mediated the relation of classroom instructional practices and conditions (i.e., instructional quality, classroom management, teacher affect, class climate) to reading comprehension. Additionally, this study examined how students' entry-level



* Significance at the .01 level.

Figure 14. Moderation model for cognitive engagement in treatment condition.

reading skills (i.e., comprehension and word reading) interacted with behavioral and cognitive engagement to predict comprehension. Data from a previously conducted randomized controlled trial examining the effects of a multi-component comprehension intervention to business-as-usual practices were used to examine context, engagement, student reading skills, and reading comprehension relations. Overall, findings indicated that behavioral engagement predicted comprehension outcomes in both the treatment and business-as-usual conditions. However, behavioral engagement partially mediated the effect of classroom practices on comprehension in the treatment condition but not in the business-as-usual condition. Cognitive engagement did not significantly predict comprehension outcomes in either condition, and there were no significant mediation effects. Furthermore, students' initial reading skills did not moderate the effect of engagement on comprehension. Following, I discuss findings for each research question

relative to the Guthrie, Wigfield, and You (2012) model of comprehension and engagement. Then, I identify and discuss the limitations of the present study, general implications, conclusions, and next steps.

Research Question 1: How Does Engagement Mediate the Role of Classroom Practices and Conditions?

While many studies have documented the impact of specific classroom practices and conditions on reading outcomes, Guthrie, Wigfield, and You (2012) postulated that the efficacy of these practices is mediated by students' engagement. This present study specifically examined this relationship by comparing findings of two types of engagement (i.e., behavioral and cognitive) on classroom practices and conditions between treatment and business-as-usual conditions.

Behavioral engagement. Behavioral engagement was defined as students' levels of effort and persistence (Guthrie, Wigfield, and You, 2012). Within this study, findings indicated that behavioral engagement predicted comprehension outcomes in the treatment condition and business-as-usual conditions. Additionally, the role that engagement played in mediating the impact of classroom practices and conditions on comprehension differed by condition. Specifically, behavioral engagement mediated the impact of classroom practices and conditions on comprehension within the treatment condition, but not the business-as-usual condition. These findings support a portion of the model proposed by Guthrie et al. (2012) that suggest that behavioral engagement directly impacts reading comprehension, as in both the treatment and business-as-usual conditions, the path from behavioral engagement to comprehension was statistically significant. Additionally, these findings were similar to Wigfield et al. (2008), who

found that behavioral engagement mediated the effect of classroom practices and conditions on comprehension; however, they found full mediation, and this study only found partial mediation. In other words, in both studies, classroom practices and conditions significantly impacted behavioral engagement in the context of a multi-component intervention, but in the current study, behavioral engagement only slightly increased the effect that classroom practices and conditions had on comprehension, while in the Wigfield et al. study, behavioral engagement fully influenced the effect of classroom practices and conditions on comprehension. This finding may be due to the variables that made up the classroom practice and conditions component of the model since they differed between the two studies. In the current study, the classroom practices and conditions variable consisted of teachers' instructional quality, classroom climate, classroom management, and affect. In the Wigfield et al. study the classroom practices and conditions variable was made up of intervention components such as using content goals and themes, affording choice to students, providing hands-on activities, using interesting texts, and providing opportunities for students to collaborate. These different variables may impact behavioral engagement differently, suggesting that more research is needed to determine which classroom practices and conditions most impact engagement and ultimately comprehension. In both studies, however, the level to which students were engaged impacted the extent to which classroom practices and conditions influenced comprehension outcomes.

Findings are consistent with prior research showing that when teachers use high-quality instructional practices, have good classroom management, and create environments that are warm and respectful, student engagement and comprehension

outcomes ultimately increase (Fredricks et al., 2004; Guthrie & Cox, 2001). In the multi-component reading comprehension intervention utilized in this study, teachers were provided and prompted to implement multiple instructional practices (e.g., collaboration support, strategy instruction) empirically demonstrated to increase student engagement. Perhaps when coupled with a well-managed, warm, and respectful class environment, the impact of the classroom practices and conditions on comprehension was higher. While the intervention did not lead to significant differences between conditions at posttest on comprehension, students' behavioral engagement was positively impacted in the treatment classes through a combination of high-quality instruction, warm teacher affect, respectful classroom climate, and good classroom management. Interestingly, the means and standard deviations of the global scales of classroom management, classroom climate, instructional quality, and teacher affect at face value appear to differ just slightly between conditions, suggesting that it may be the "latent" classroom practices and conditions component that contributed to mediation. Perhaps the collective influence of classroom climate, classroom management, class climate, and teacher affect on engagement positively influenced the relationship of classroom practices and conditions to comprehension in the context of a multi-component reading comprehension intervention that included engagement-enhancing components (e.g., collaboration support). Because the classroom practices and conditions variable was a latent construct consisting of multiple components (e.g., class climate, instructional quality), further research is needed to identify the classroom and conditions components that most effectively enhance behavioral engagement and reading comprehension. Additionally, it

is important to continue to research this area to “disentangle” comprehension versus engagement effects.

Cognitive engagement. Cognitive engagement was defined as an investment in learning, which included being thoughtful and strategic (Fredricks et al., 2004; Fredricks & McColskey, 2012). Within this study, I was interested in whether cognitive engagement would mediate the effect of classroom practices and conditions on reading comprehension. Overall findings indicated that classroom practices and conditions (i.e., classroom climate, classroom management, instructional quality, teacher affect) significantly impacted comprehension outcomes in the treatment classes, and classroom practices and conditions significantly impacted engagement in the business-as-usual condition. However, while behavioral engagement partially mediated the effect of classroom practices and conditions on reading comprehension in the treatment classes, there was no significant mediation by cognitive engagement in either condition. This lack of relationship for cognitive engagement can be interpreted in two ways: (a) cognitive engagement was not measured adequately, or (b) the classroom practices and conditions measured were not appropriate to impacting cognitive engagement.

Measurement of cognitive engagement. In this study, the questions from the MSLQ that were used to measure cognitive engagement in reading were not all specific to reading. Specifically, two of the nine questions were reading specific (e.g., When I am reading, I stop once in a while and go over what I have read), while the other seven were related to studying in general (e.g., When I study I put important ideas into my own words). Little is known about whether engagement is domain general or content specific (Fredricks et al., 2004). Questions that were related to both reading and studying in

general were used, thus, cognitive engagement in reading may not have been captured with this measure.

While it is widely agreed that engagement can in fact be changed (Christenson et al., 2012), more research is needed to determine the extent to which cognitive engagement changes as context and practices change. Practices that influence students' depth of processing and cognition (e.g., metacognition, higher-order thinking) are clearly more involved than those that encourage students to persist with a task (e.g., warm and respectful classroom environment). While the CCT intervention was designed to engage students in higher-order cognitive tasks, these types of tasks are difficult to measure and intuitively more challenging than behavioral tasks. Classroom interventions targeting cognitive engagement are necessary to understand this impact and relationship. Additionally, more frequent measurement of engagement is also needed. Previous reviews on adolescent reading comprehension interventions (Anderson, in preparation) have shown that a limited number of studies (9%) actually measured engagement; thus, it is important that intervention studies include engagement measures so that the degree to which classroom practices and conditions impact engagement and ultimately students' outcomes can be determined.

Measurement of classroom practices and conditions. Within this study, classroom practices and conditions were measured by focusing on class climate, classroom management, instructional quality, and teacher affect. A well-managed classroom where teachers and students respect each other may impact students' behavioral engagement because they are more likely to feel safe and comfortable in an environment such as this, and consequently will be more effortful and persistent in a

difficult reading task. Perhaps it is not these same indicators that increase students' cognitive engagement in reading. To impact cognitive engagement, the classroom practices and conditions variable may need to consist of teachers' use of metacognition, higher-order questioning, and strategy instruction rather than variables such as teacher affect and class climate. In the construction-integration theory of reading (Kintsch, 1998), students must not only understand what they are reading at the text-base level, but they must also be able to connect what they are reading to their prior knowledge, thus creating a comprehensive understanding of the text as a whole. To create this coherent representation of text, students must use cognitive strategies (e.g., comprehension monitoring, inference making). Cognitive engagement is very different than behavioral engagement; students who are cognitively engaged are strategic in how they approach a reading task and monitor their comprehension, while students who are behaviorally engaged in the reading task are effortful and persistent, even when a reading task is challenging. It is possible that students may be behaviorally engaged but not cognitively engaged, and, thus, a different set of practices may impact each type of engagement, as was found in this study. Future research should continue to examine the classroom practices that are most important at improving cognitive engagement in reading and ultimately comprehension.

Research Question 2: How Does Students' Initial Reading Skill Moderate the Relation of Engagement and Comprehension?

Few studies have documented the role of students' initial skill level in influencing the relationship between engagement and comprehension (Klauda & Guthrie, 2015). Within this study, I examined whether students' initial reading skills, as measured by

their entry-level comprehension and word reading skills, would moderate the relation between behavioral and cognitive engagement and comprehension. Overall findings indicated that students' initial reading skills did not differentially influence the relationship between behavioral and cognitive engagement and reading comprehension across conditions. Klauda and Guthrie (2015) offered potential hypotheses about the role that students' initial reading skills may play in the relationship between engagement and comprehension. Results from this study align with one of their hypotheses that stated that there are not differences between struggling and more proficient readers in these connections. Klauda and Guthrie hypothesized that "there is developmental continuity in the relations of motivation and engagement" (p. 241), meaning that motivation and engagement change and develop across grade levels. Perhaps by the time students reach middle and high school, their motivation and engagement are more entrenched and less malleable to instruction. This study's findings differed from those of Klauda and Guthrie, who found that there was a stronger relationship between engagement and achievement in the advanced reader group than in the struggling reader group. They found support for one of their hypotheses that the relationship between engagement and achievement for struggling readers may be limited due to the cognitive challenges they have since they lack the necessary reading skills, making the reading process very challenging. An additional reason for the findings from the present study may be attributable to how engagement was measured. Within the current study, a variation of the MSLQ was used to measured behavioral and cognitive engagement. Perhaps this measure was not actually measuring behavioral and cognitive engagement but another, related, construct. The definitions of these types of engagement measures themselves are

highly debatable, which makes measuring them and interpreting findings consistently a significant challenge. The engagement construct itself is multi-dimensional and "messy" because the three different types of engagement (i.e., cognitive, behavioral, emotional) overlap with each other as well as with other constructs (e.g., motivation; Fredricks et al., 2004). Research needs to more carefully examine how these constructs are defined and measured (Fredricks et al., 2004; Reschly & Christenson, 2012).

Implications for Guthrie's Model and General Instructional Practices

These results provide support for the part of the Guthrie, Wigfield, and You (2012) theoretical model that posits that reading comprehension can be promoted through behavioral engagement (i.e., path B/F). While the same effect was not found for cognitive engagement, this could be explained potentially by how cognitive engagement was measured (Fredricks et al., 2004; Reschly & Christenson, 2012) or on which instructional practices were measured. Additionally, the results support one of the hypotheses by Guthrie, Wigfield, and You (2012), which stated that students' entry-level reading skills do not differentially impact the relationship of behavioral and cognitive engagement to reading comprehension.

The general instructional implications of the current study are important in finding that increasing behavioral engagement may promote later comprehension. This study demonstrated that behavioral engagement partially mediated the effect of classroom practices and conditions on reading comprehension in the treatment condition but not the comparison. This could be in part due to how the latent construct of classroom practices and conditions (e.g., classroom climate, classroom management) interacted with the multi-component reading comprehension intervention to impact student reading

outcomes. Based on these findings and those of Wigfield et al. (2008), if teachers optimize students' engagement in reading, it is reasonable to assume that this increased engagement will ultimately increase the effect of instruction on comprehension. Thus, it is important that teachers focus on high-quality instruction, good classroom management, and creating a classroom environment where teachers and students respect each other. By doing this, students may be more engaged in the reading process, which would ultimately increase the levels at which they comprehend what they are reading.

Limitations

It is important to discuss the findings of this study in the context of the following limitations. First, while the MSLQ has frequently been used to measure students' engagement (Pintrich & De Groot, 1990), the original measure was designed for college-age students and included 81 questions. For this study, the measure was reworked to decrease the number of items (81 vs. 31), as well as re-worded to be more student friendly since this study had middle and high school students. Due to differences in cognitive development and measurement, the measure may work very differently in the current sample and may make interpretations and relations to prior studies more tenuous. Furthermore, only a small number of these 31 questions were used to represent behavioral (N = 4) and cognitive engagement (N = 9). An additional limitation was how the classroom practices and conditions variable was measured. A limited set of indicators were used to represent the classroom practices and conditions latent variable (i.e., instructional quality, classroom management, teacher affect, and class climate). Guthrie, Wigfield, and You (2012) recommended a range of other practices that impact student engagement in reading (i.e., autonomy support, strategy instruction, providing relevance).

These additional instructional practices warrant examination but were not included in this particular study and may have modified interpretation had they been included. Furthermore, to represent behavioral and cognitive engagement, we only used one dimension for each. While effort and persistence, and self-regulation are indicators of behavioral and cognitive engagement respectively, there are many other indicators of these types of engagement that were not included in this study (Guthrie, Wigfield, & You, 2012; Fredricks et al., 2004; Reschly & Christenson, 2012). Finally, analysis did not recognize the nested/multilevel nature of the data. Further analyses should take the class level into consideration.

Conclusion

In summary, this study found that behavioral engagement predicted comprehension in both the treatment and business-as-usual conditions. Cognitive engagement, however, did not predict comprehension in either condition. Additionally, this study found that behavioral engagement partially mediated the influence of classroom practices and conditions on comprehension in the treatment condition but not the business-as-usual condition. No mediation effects of cognitive engagement were found in either condition. This provides evidence that the effect of classroom practices and conditions (i.e., classroom climate, classroom management, teacher affect, class climate) on comprehension can positively impact students' behavioral engagement in the context of a multi-component reading comprehension intervention, thus suggesting that teachers should consider creating a class environment that includes high-quality instruction, positive teacher affect, a warm class climate, and good classroom management. Additionally, this study provides support for one of Guthrie, Wigfield, and

You's (2012) hypotheses that students' initial reading skills may not impact the relationship between behavioral and cognitive engagement and comprehension. Perhaps engagement levels are more entrenched for middle and high school students and less malleable to instruction.

CONCLUSION

Within the area of adolescent reading comprehension, student engagement with text is vitally important. Results of national assessments indicate that a significant number of middle and high school students struggle to read and comprehend complex texts. Engagement, and its many dimensions, has been identified as a factor that explains, in part, the challenges of adolescents with text comprehension. Fortunately, engagement is malleable and can be improved through instructional practices and contexts. In the model of reading engagement proposed by Guthrie, Wigfield, and You (2012), there is a direct relation of classroom practices and conditions to reading competence, and this relationship is mediated by students' engagement. With the demonstrated impact that student engagement has on students' reading comprehension, it is important to examine whether adolescent reading comprehension research is addressing engagement in intervention studies and the extent to which classroom practices, students' skill levels, engagement, and comprehension are related.

The purpose of the research discussed in this dissertation was to evaluate the extent to which interventions for adolescent readers incorporated engagement-enhancing components and to examine the relationship between engagement, classroom practices, students' reading skills, and comprehension. To achieve the goal, two studies were conducted. The first study was a systematic review of the literature that evaluated the inclusion of engagement-enhancing components and measurement of engagement in adolescent reading comprehension interventions. The second study used an extant data set to examine the relationship between classroom practices, adolescents' reading skills, engagement, and comprehension.

Summary of Study 1 Findings

Study 1 identified the specific engagement-enhancing instructional practices (e.g., autonomy support, strategy instruction, collaboration support) most used in adolescent reading comprehension interventions published between the years 2000 and 2014. Additionally, it examined the extent to which engagement was measured, the dimensions of engagement commonly measured, the most common methods of measurement, and whether or not engagement was statistically linked to student outcomes. The following research questions were addressed:

1. To what degree do reading comprehension interventions involving adolescents include components shown to increase student engagement? And which components were most prominently used?
2. What percentage of the studies measured engagement? And which dimensions of engagement were measured (e.g., cognitive, behavioral)?
3. What were the most common methods of measurement (e.g., student report, teacher report, observation)? And what specific engagement measures were used (e.g., Reading Engagement Index)?
4. What percentage of articles reported a relation between engagement and student outcomes? If engagement was statistically linked to student outcomes, were effect sizes significant?

Of the 76 articles (80 studies) coded in this review, the majority (95%) included at least one engagement-enhancing component. The most common engagement-enhancing component included was strategy instruction (77.6%). Real-world interaction was used the least (2.6%). Other components included providing interesting texts, collaboration,

autonomy support, student evaluation, praise/rewards and feedback, technology, and providing relevance. This finding suggests that the field of adolescent reading comprehension is consistently including engagement-enhancing components in its research. Additionally, the consistent use of strategy instruction is promising because students may feel empowered when they have a plan and tools when reading, which may increase their engagement in the reading task and ultimately their comprehension.

While engagement-enhancing components were commonly used, few studies (9%) actually measured engagement. With the exception of one study that measured cognitive engagement, behavioral engagement was the only type of engagement measured. If there are specific components designed to promote engagement, we cannot fully attribute or explain the influence of these components until it is measured. Additionally, it is important to measure more than just one type of engagement since they may not work in isolation. For instance, to understand text, students may need to be behaviorally (e.g., be effortful and persistent), cognitively (e.g., use reading strategies), and emotionally (e.g., be enthusiastic about the reading task) engaged. Thus, it is important to examine how multiple dimensions of engagement interact to impact comprehension.

In the seven studies that measured engagement, only live observation and student self-report methods were used. Live observations are commonly used to measure engagement, but they may only give one view of the contextual factors that influence engagement (Fredricks et al., 2004). To better understand how and why these contexts work, other methods to supplement live observation should be used. Additionally, researchers should consider using both qualitative and quantitative methods to measure

engagement as a way to better understand how engagement impacts achievement in their interventions.

Of the seven studies that measured engagement, only three studies examined the statistical relation between engagement and student outcomes. Of the studies that examined the influence of engagement on comprehension, all three found a statistically significant relationship between engagement and comprehension outcomes. In order to examine the connection between engagement and student outcomes and the practices that impact engagement the most, it is critical that engagement is measured.

Results from the first study provided evidence that:

1. The majority of adolescent reading comprehension interventions published between 2000 and 2014 included at least one engagement-enhancing component.
2. The most common engagement-enhancing component used was strategy instruction.
3. A limited number of studies measured engagement and statistically linked engagement to student outcomes.
4. When the statistical relation between engagement and student outcomes was examined, there was a positive and significant effect.

These findings have important implications for the field because while engagement-enhancing components are frequently used in adolescent reading comprehension interventions, limited attention is given to the measurement of engagement and its statistical connection to student outcomes. With the significant number of middle and high school students not meeting proficiency standards with

respect to reading and the demonstrated impact that engagement has on reading outcomes, it is crucial that researchers explore the role that engagement plays in the context of the classroom.

Summary of Study 2 Findings

The second study investigated the role of engagement in the reading process by examining broader classroom practices and conditions (i.e., quality of instruction, class climate, teachers' classroom management, and teacher affect) and how they impacted students' engagement in reading. An extant data set from a large randomized controlled trial studying the effects of a multi-component reading comprehension intervention on students' reading comprehension was used to examine whether engagement (i.e., cognitive, behavioral), specifically students' effort, persistence, and self-regulation, mediated the effect of classroom practice and conditions (i.e., quality of instruction, teacher affect, classroom climate, and classroom management) on reading comprehension outcomes in the context of a multi-component reading comprehension. Additionally, it examined whether the effect of engagement on reading comprehension was moderated by students' initial reading skill level (e.g., comprehension and word reading). Specific research questions included:

1. To what extent is the effect of classroom practice and conditions (i.e., quality of instruction, classroom management, teacher affect, class climate) on reading comprehension mediated by the students' levels of cognitive and behavioral engagement in both the treatment and business-as-usual conditions?

2. Is the effect of behavioral and cognitive engagement (i.e., self-regulation, effort/persistence) on reading comprehension achievement moderated by students' initial reading skills (i.e., word reading and comprehension) in both the treatment and business-as-usual conditions?

Tables 4 and 5 provide a summary of the results. In regards to behavioral engagement as a mediator, findings indicated that behavioral engagement predicted comprehension in both the treatment ($\beta = .236$, $p < .001$) and business-as-usual conditions ($\beta = .290$, $p < .001$). However, the indirect effect of classroom practices and conditions predicting comprehension via behavioral engagement was only significant in the treatment condition ($\beta = .046$, $p = .018$). In other words, part of the total effect of classroom practices and conditions on reading competence was mediated by behavioral engagement in the treatment group, but the significant direct path from classroom practices and conditions on reading competence suggested only partial mediation. This finding suggests that the collective influence of classroom climate, classroom management, instructional quality, and teacher affect on engagement may positively influence the relationship of classroom practices and conditions to comprehension in the context of a multi-component reading comprehension intervention. This partial mediation suggests that there may be other factors that are influencing this relation, however.

In regards to cognitive engagement as a mediator, findings indicated that cognitive engagement did not significantly predict comprehension in either the business-as-usual condition ($\beta = -.018$, $p = .769$) or the treatment condition ($\beta = -.024$, $p = .664$). Additionally, the indirect effect of classroom practices and conditions predicting

comprehension via cognitive engagement was not significant in either the business-as-usual condition ($\beta = -.003$, $p = .771$) or the treatment condition ($\beta = -.002$, $p = .684$). This lack of relationship for cognitive engagement may be due either to the way cognitive engagement was measured or to the components that made up the classroom practices and conditions latent variable. Perhaps the MSLQ questions used in this study did not actually measure cognitive engagement, or the indicators used that impacted behavioral engagement were not the same indicators that would impact cognitive engagement.

Table 4

Summary of Mediation Results

Engagement/ Condition	Independent Variable	Mediating Variable	Dependent Variable	Effect of IV on Mediator	Effect of Mediator	Direct Effect	Indirect Effect	Total Effect	Degree of Mediation
Behavioral/ Full Sample	CPC	B. Eng.	Comp.	.110*	.267*	.144*	.029*	.173*	Partial
Behavioral/ Control	CPC	B. Eng.	Comp.	.029	.290*	.002	.008	.010	None
Behavioral/ Treatment	CPC	B. Eng.	Comp.	.193*	.236*	.265*	.046*	.311*	Partial
Cognitive/ Full Sample	CPC	C. Eng.	Comp.	.117*	-.028	.173*	-.003	.170	None
Cognitive/ Control	CPC	C. Eng.	Comp.	.151*	-.018	.010	-.003	-.007	None
Cognitive/ Treatment	CPC	C. Eng.	Comp.	.101	-.024	.307*	-.002	.305	None

Note. CPC = Classroom Practices and Conditions (i.e., teacher affect, classroom climate, classroom management, instructional quality), B. Eng. = Behavioral Engagement (i.e., effort and persistence), C. Eng. = Cognitive Engagement (i.e., self-regulation), Comp. = Comprehension, IV = Independent Variable, and DV = Dependent Variable.
* Significant at the .01 level.

Table 5

Summary of Moderation Results

Engagement/ Condition	Independent Variable (IV)	Moderating Variables	Dependent Variable (DV)	Effect of Moderator	Effect of IV on DV	Interaction Effect	Degree of Moderation
Behavioral/ Full Sample	B. Eng.	Skills	Comp.	11.89*	.556	.472	None
Behavioral/ Control	B. Eng.	Skills	Comp.	12.89*	.401	.344	None
Behavioral/ Treatment	B. Eng.	Skills	Comp.	11.25*	1.04	.486	None
Cognitive/ Full Sample	C. Eng.	Skills	Comp.	12.24*	.510	-.344	None
Cognitive/ Control	C. Eng.	Skills	Comp.	12.91*	1.83	-.902	None
Cognitive/ Treatment	C. Eng.	Skills	Comp.	11.67*	-.248	.041	None

Note. B. Eng. = Behavioral Engagement (i.e., effort and persistence), C. Eng. = Cognitive Engagement (i.e., self-regulation), Skills = Students' Initial Reading Skills (i.e., word reading, comprehension), and Comp. = Comprehension.
* Significant at the .01 level.

Regarding whether the effect of behavioral and cognitive engagement on reading comprehension was moderated by students' initial reading skills in both the business-as-usual and treatment conditions, findings indicated that there was no interaction between students' entry-level reading skills and behavioral engagement in either the business-as-usual (b = .344, *p* = .691) or treatment conditions (b = .486, *p* = .563). Additionally, there was no interaction between students' entry-level reading skills and cognitive engagement in either the business-as-usual (b = -.902, *p* = .359) or treatment conditions (b = .041, *p* = .973). This finding may be due to the fact that by the time students reach middle and high school, their motivation and engagement are more engrained and less flexible to instruction.

Results from the second study provided evidence that:

1. The relation of classroom practices and conditions to comprehension is mediated by behavioral engagement but not cognitive engagement in the context of a multi-component reading comprehension intervention.
2. The interaction between students' entry-level reading skills and behavioral and cognitive engagement does not significantly predict comprehension outcomes.

These findings have important implications for the field because they provide evidence that high-quality instruction, positive teacher affect, a warm class climate, and good classroom management (i.e., classroom practices and conditions) can positively influence students' effort and persistence (i.e., behavioral engagement) in reading and that this behavioral engagement can positively influence the impact that classroom practices and conditions has on comprehension. Findings also suggest that much is still

to be learned about how to best increase students' cognitive engagement and about how students' reading levels interact with engagement and ultimately comprehension.

Limitations and Future Directions for Both Studies

The one major limitation that spans both studies is that the construct of student engagement is unwieldy. People define and therefore measure engagement in vastly different ways, making it difficult to fully understand the role that engagement plays in the reading comprehension process for middle and high school students. Engagement is a term that many people use, and it is widely agreed upon that engagement is an important ingredient for successful text comprehension. Yet, because of the complexity of the construct, engagement is not measured the same way, making it difficult to assess and explain the instruction-engagement-outcomes logic chain. More research is needed to build consensus on what the correct definition is so that we can better investigate its utility and how to properly enhance engagement in instruction.

Implications

While the majority of reading comprehension interventions for middle and high school students include engagement-enhancing components, little attention is given to the measurement of engagement and its relation to student outcomes. To understand how and why engagement impacts students' reading comprehension, it is imperative that researchers more frequently measure different dimensions of engagement and connect these different dimensions to student outcomes. To do this, more consensus should be reached as to the proper definition and components of engagement and how best to measure it. Current models (e.g., Guthrie, Wigfield, and You, 2012) provide working dimensions of engagement that guide how to structure instructional context and practices.

Specifically, to increase students' effort and persistence (i.e., behavioral engagement) in reading and ultimately their comprehension, teachers should consider creating a class environment that is well managed, warm, respectful, and includes high-quality instructional practices. Models suggest that behavioral engagement is at least in part influenced by instructional practices. Further research is needed to understand the mechanisms that influence multiple dimensions (i.e., affective, cognitive) of engagement to understand how to optimize their impact

Conclusion

The ability to read and comprehend complex text is extremely important for success in higher education and the workforce, yet large numbers of middle and high school students fail to meet proficiency standards. There is general agreement that engagement is malleable and co-varies with instructional practices and contexts. Nonetheless, few adolescent reading comprehension studies have measured engagement and statistically examined the relation of classroom practices to engagement. There are promising findings that in the context of a multi-component intervention, a classroom with high-quality instruction, a warm and respectful feeling, and good classroom management can impact students' effort and persistence in reading and ultimately comprehension. While much has been learned about the construct of student engagement, there remain many unknowns. How does one define behavioral, affective and cognitive engagement? How does one best measure behavioral, affective, and cognitive engagement? What are the practices that most influence behavioral, affective and cognitive engagement? What student skills impact behavioral, affective, and cognitive engagement and how does this interaction impact comprehension? These

questions can provide a life's work for a young researcher who is eager to address these problems.

REFERENCES

Alexander, K. L., Entwisle, D. R., & Horsey, C. S. (1997). From first grade forward: Early foundations of high school dropout. *Sociology of Education*, *70*(2), 87-107.

Alexander, P. A., & Jetton, T. L. (1996). The role of importance and interest in the processing of text. *Educational Psychology Review*, *8*(1), 89-121.

Anderman, L. H. (1999). Classroom goal orientation, school belonging and social goals as predictors of students' positive and negative affect following the transition to middle school. *Journal of Research & Development in Education*, *32*(2), 89-103.

Anderson, L. (2015). *A literature review of student engagement within adolescent reading comprehension interventions*. Manuscript in preparation.

Appleton, J. J., Christenson, S. L., Kim, D., & Reschly, A. L. (2006). Measuring cognitive and psychological engagement: Validation of the Student Engagement Instrument. *Journal of School Psychology*, *44*(5), 427-445.

Assor, A., Kaplan, H., & Roth, G. (2002). Choice is good, but relevance is excellent: Autonomy-enhancing and suppressing teacher behaviours predicting students' engagement in schoolwork. *British Journal of Educational Psychology*, *72*(2), 261-278.

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.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Macmillan.

Battistich, V., Schaps, E., & Wilson, N. (2004). Effects of an elementary school intervention on students' "connectedness" to school and social adjustment during middle school. *Journal of Primary Prevention*, *24*(3), 243-262.

Berndt, T. J., & Keefe, K. (1995). Friends' influence on adolescents' adjustment to school. *Child Development*, *66*(5), 1312-1329.

Biancarosa, G., & Snow, C. E. (2004). *Reading next—A vision for action and research in middle and high school literacy: A report from Carnegie Corporation of New York*. Washington, DC: Alliance for Excellent Education.

Birch, S. H., & Ladd, G. W. (1997). The teacher-child relationship and children's early school adjustment. *Journal of School Psychology*, *35*(1), 61-79.

Blumenfeld, P., Modell, J., Bartko, W. T., Secada, W. G., Fredricks, J. A., Friedel, J., . . . & Chatman, C. (2005). School engagement of inner-city students during middle childhood. In C. R. Cooper, C. G. Coll, W. T. Bartko, H. M. Davis, & C. Chatman (Eds.), *Developmental pathways through middle childhood: Rethinking contexts and diversity as resources* (pp. 145-170). Mahwah, NJ: Lawrence Erlbaum.

Brophy, J. (1981). Teacher praise: A functional analysis. *Review of Educational Research*, *51*(1), 5-32.

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.

Carnegie Council on Advancing Adolescent Literacy. (2010). *Time to act: An agenda for advancing adolescent literacy for college and career success.* New York, NY: Carnegie Corporation of New York.

Cash, T. F. (2009). Caveats in the proficient preparation of an APA-style research manuscript for publication. *Body Image, 6*(1), 1-6. doi:10.1016/j.bodyim .2008.10.003

Ceci, S. J., & Papierno, P. B. (2005). The rhetoric and reality of gap closing: When the "have-nots" gain but the "haves" gain even more. *American Psychologist, 60*(2), 149-160.

Chi, M. T. H. (2009). Active-constructive-interactive: A conceptual framework for differentiating learning activities. *Topics in Cognitive Science, 1*, 73-105.

Christenson, S. L., Reschly, A. L., & Wylie, C. (Eds.). (2012). *Handbook of research on student engagement*. New York, NY: Springer Science & Business Media.

Conchas, G. Q. (2001). Structuring failure and success: Understanding the variability in Latino school engagement. *Harvard Educational Review, 71*(3), 475-505.

Connell, J. P., & Wellborn, J. G. (1991). Competence, autonomy, and relatedness: A motivational analysis of self-system processes. In J. Connell, J. Wellborn, M. Gunnar, & L. Srouge (Eds.), *Self processes and development: The Minnesota symposia on child psychology* (pp. 43-77). Hillsdale, NJ: Lawrence Erlbaum.

Csikszentmihalyi, M., & Larson, R. (1987). Validity and reliability of the experience-sampling method. *The Journal of Nervous and Mental Disease, 175*(9), 526-536.

Dane, A. V., & Schneider, B. H. (1998). Program integrity in primary and early secondary prevention: Are implementation effects out of control? *Clinical Psychology Review, 18*(1), 23-45.

Decker, D. M., Dona, D. P., & Christenson, S. L. (2007). Behaviorally at-risk African American students: The importance of student–teacher relationships for student outcomes. *Journal of School Psychology*, *45*(1), 83-109.

Doyle, W. (1986). Classroom organization and management. In M. Wittrock (Ed.), *Handbook of research on teaching* (pp. 392-431). New York, NY: Macmillan.

Edmonds, M. S., Vaughn, S., Wexler, J., Reutebuch, C., Cable, A., Tackett, K. K., & Schnakenberg, J. W. (2009). A synthesis of reading interventions and effects on reading comprehension outcomes for older struggling readers. *Review of Educational Research*, *79*, 262-300. doi:10.3102/0034654308325998

Edwards, M. A. (2013, March). The 6 key drivers of student engagement. *T.H.E. Journal*. Retrieved from http://online.qmags.com/TJL0313/default .aspx?pg=23&mode=1#pg26&mode1

Finn, J. D. (1989). Withdrawing from school. *Review of Educational Research*, *59*(2), 117-142.

Finn, J. D., & Rock, D. A. (1997). Academic success among students at risk for school failure. *Journal of Applied Psychology*, *82*(2), 221-234.

Flowerday, T., & Schraw, G. (2003). Effect of choice on cognitive and affective engagement. *The Journal of Educational Research*, *96*(4), 207-215.

Foorman, B. R., & Schatschneider, C. (2003). Measurement of teaching practices during reading/language arts instruction and its relationship to student achievement. In S. Vaughn & K. Briggs (Eds.), *Reading in the classroom: Systems for the observation of teaching and learning* (pp. 1-30). Baltimore, MD: Brooks.

Foorman, B. R., Schatschneider, C., Eakin, M. N., Fletcher, J. M., Moats, L. C., & Francis, D. J. (2006). The impact of instructional practices in grades 1 and 2 on reading and spelling achievement in high poverty schools. *Contemporary Educational Psychology, 31*(1), 1-29.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74*(59), 59-108.

Fredricks, J., McColskey, W., Meli, J., Mordica, J., Montrosse, B., & Mooney, K. (2011). Measuring Student Engagement in Upper Elementary through High School: A Description of 21 Instruments. Issues & Answers. REL 2011-No. 098. *Regional Educational Laboratory Southeast*.

Fredricks, J. A., & McColskey, W. (2012). The measurement of student engagement: A comparative analysis of various methods and student self-report instruments. In S. Christenson, A. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 763-782). New York, NY: Springer.

Goodenow, C. (1993). Classroom belonging among early adolescent students relationships to motivation and achievement. *The Journal of Early Adolescence, 13*(1), 21-43.

Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading, and reading disability. *Remedial and Special Education*, *7*(1), 6-10.

Guthrie, J. T., & Cox, K. E. (2001). Classroom conditions for motivation and engagement in reading. *Educational Psychology Review, 13*(3), 283-302.

Guthrie, J. T., Cox, K. E., Anderson, E., Harris, K., Mazzoni, S., & Rach, L. (1998). Principles of integrated instruction for engagement in reading. *Educational Psychology Review, 10*(2), 177-199.

Guthrie, J. T., & Davis, M. H. (2003). Motivating struggling readers in middle school through an engagement model of classroom practice. *Reading & Writing Quarterly, 19*(1), 59-85.

Guthrie, J. T., & Humenick, N. M. (2004). Motivating students to read: Evidence for classroom practices that increase reading motivation and achievement. In P. McCardle & V. Chhabra (Eds.), *The voice of evidence in reading research* (pp. 329-354). Baltimore, MD: Brookes.

Guthrie, J. T., & McCann, A. D. (1997). Characteristics of classrooms that promote motivations and strategies for learning. In J. T. Guthrie & A. Wigfield (Eds.), *Reading engagement: Motivating readers through integrated instruction* (pp. 128-148). Newark, DE: International Reading Association.

Guthrie, J. T., McGough, K., Bennett, L., & Rice, M. E. (1996). *Concept-oriented reading instruction: An integrated curriculum to develop motivations and strategies for reading*. Washington, DC: U.S. Department of Education.

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*(4), 237-250.

Guthrie, J, T., & Wigfield, A. (2000). Engagement and motivation in reading. In M. Kamil, P. Mosenthal, D. Pearson, & R. Barr (Eds.), *Handbook of reading research* (pp. 403-422). Mahwah, NJ: Lawrence Erlbaum.

Guthrie, J. T., Wigfield, A., & Klauda, S. L. (2012). *Adolescents' engagement in academic literacy*. Sharjah, UAE: Bentham Science.

Guthrie, J. T., Wigfield, A., Metsala, J. L., & Cox, K. E. (1999). Motivational and cognitive predictors of text comprehension and reading amount. *Scientific Studies of Reading*, *3*(3), 231-256.

Guthrie, J. T., Wigfield, A., & Perencevich, K. C. (Ed.). (2004). *Motivating reading comprehension: Concept-oriented reading instruction.* Mahwah, NJ: Lawrence Erlbaum.

Guthrie, J. T., Wigfield, A., & You, W. (2012). Instructional contexts for engagement and achievement in reading. In S. Christenson, A. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 601-634). New York, NY: Springer.

Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, *77*(1), 81-112.

Hektner, J. M., Schmidt, J. A., & Csikszentmihalyi, M. (2007). *Experience sampling method: Measuring the quality of everyday life*. New York, NY: Sage.

Helme, S., & Clarke, D. (2001). Identifying cognitive engagement in the mathematics classroom. *Mathematics Education Research Journal*, *13*(2), 133-153.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1-55.

Hulleman, C. S., & Harackiewicz, J. M. (2009). Promoting interest and performance in high school science classes. *Science*, *326*(5958), 1410-1412.

Jang, H. (2008). Supporting students' motivation, engagement, and learning during an uninteresting activity. *Journal of Educational Psychology, 100*(4), 798-811.

Kamil, M. L., Borman, G. D., Dole, J., Kral, C. C., Salinger, T., Torgesen, J., . . . Spier, E. (2008). *Improving adolescent literacy: Effective classroom and intervention practices: A practice guide* (NCEE #2008-4027). Washington, DC: U.S. Department of Education, National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences. Retrieved from http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=WWC20084027

Kemple, J., Corrin, W., Nelson, E., Salinger, T., Herrmann, S., Drummond, K., & Strasberg, P. (2008). *The enhanced reading opportunities study: Early impact and implementation findings* (NCEE 2008-4015) Washington, DC: U.S. Department of Education, National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences.

Kendeou, P., & van den Broek, P. (2007). The effects of prior knowledge and text structure on comprehension processes during reading of scientific texts. *Memory & Cognition, 35*(7), 1567-1577.

King, A. (2002). Structuring peer interaction to promote high-level cognitive processing. *Theory into Practice, 41*, 33-39. doi:10.1207/s15430421tip41016

Kintsch, W. (1998). The role of knowledge in discourse comprehension: A construction-integration model. *Psychological Review, 95*, 163-183. doi:10.1037/0033-295X.95.2.163

Klauda, S. L., & Guthrie, J. T. (2015). Comparing relations of motivation, engagement, and achievement among struggling and advanced adolescent readers. *Reading and Writing, 28*(2), 239-269.

Klauda, S. L., Wigfield, A., & Cambria, J. (2012). Struggling readers' information text comprehension and motivation in early adolescence. In J. Guthrie, A. Wigfield, & S. L. Klauda (Eds.), *Adolescents' engagement in academic literacy* (Report No. 7; pp. 295–351).

Klingner, J. K., Urbach, J., Golos, D., Brownell, M., & Menon, S. (2010). Teaching reading in the 21st century: A glimpse at how special education teachers promote reading comprehension. *Learning Disability Quarterly, 33*(2), 59-74.

Ladd, G. W. (1990). Having friends, keeping friends, making friends, and being liked by peers in the classroom: Predictors of children's early school adjustment? *Child Development, 61*(4), 1081-1100.

Lau, K. L. (2009). Reading motivation, perceptions of reading instruction and reading amount: A comparison of junior and senior secondary students in Hong Kong. *Journal of Research in Reading, 32*(4), 366-382.

Lee, J. (2014). The relationship between student engagement and academic performance: Is it a myth or reality? *The Journal of Educational Research, 107*(3), 177-185.

Lee, O., & Anderson, C. W. (1993). Task engagement and conceptual change in middle school science classrooms. *American Educational Research Journal, 30*(3), 585-610.

Linnenbrink, E. A., & Pintrich, P. R. (2003). The role of self-efficacy beliefs in student engagement and learning in the classroom. *Reading & Writing Quarterly, 19*(2), 119-137.

MacGarity, J. R., & Butts, D. P. (1984). The relationship among teacher classroom management behavior, student engagement, and student achievement of middle and high school science students of varying aptitude. *Journal of Research in Science Teaching, 21*(1), 55-61.

MacGinitie, W. H., MacGinitie, R. K., Maria, K., & Dreyer, L. G. (2010). *Gates-MacGinitie Reading Tests* (4th ed.). Itasca, IL: Riverside.

Marks, H. M. (2000). Student engagement in instructional activity: Patterns in the elementary, middle, and high school years. *American Educational Research Journal, 37*(1), 153-184.

Marzano, J. S., & Pickering, D. (2003). *Classroom management that works: Research-based strategies for every teacher*. Alexandria, VA: Association for Supervision and Curriculum Development.

Mashburn, A. J., Pianta, R. C., Hamre, B. K., Downer, J. T., Barbarin, O. A., Bryant, D., . . . Howes, C. (2008). Measures of classroom quality in prekindergarten and children's development of academic, language, and social skills. *Child Development, 79*(3), 732-749.

McNamara, D. S., & Kintsch, W. (1996). Learning from texts: Effects of prior knowledge and text coherence. *Discourse Processes, 22*(3), 247-288.

Midgley, C., & Urdan, T. (1995). Predictors of middle school students' use of self-handicapping strategies. *The Journal of Early Adolescence, 15*(4), 389-411.

Moje, E. B., Young, J. P., Readence, J. E., & Moore, D. W. (2000). Reinventing adolescent literacy for new times: Perennial and millennial issues. *Journal of Adolescent and Adult Literacy*, *43*(5), 400-411.

Muthén, L. K., & Muthén, B. O. (1998-2012). *Mplus user's guide: The comprehensive modeling program for applied researchers*. Los Angeles, CA: Muthén & Muthén.

National Center for Education Statistics. (2012). *The nation's report card: Vocabulary results from the 2009 and 2011 NAEP reading assessments* (NCES 2013-452). Washington, DC: U.S. Department of Education, Institute of Education Sciences. Retrieved from http://nces.ed.gov/nationsreportcard/pdf/main2011/2013452.pdf

National Governors Association Center for Best Practices & Council of Chief State School Officers. (2010). *Common core state standards*. Washington, DC: Authors. Retrieved from http://www.corestandards.org/the-standards

National Research Council and Institute of Medicine. (2004). *Engaging schools: Fostering high school students' motivation to learn.* Washington, DC: The National Academy Press.

Newmann, F. M., Wehlage, G. G., & Lamborn, S. D. (1992). The significance and sources of student engagement. In F. Newmann (Ed.), *Student engagement and achievement in American secondary schools* (pp. 11-39). New York, NY: Teachers College Press.

Patrick, H., Ryan, A. M., & Kaplan, A. (2007). Early adolescents' perceptions of the classroom social environment, motivational beliefs, and engagement. *Journal of Educational Psychology*, *99*(1), 83-98.

Perfetti, C., & Stafura, J. (2014). Word knowledge in a theory of reading comprehension. *Scientific Studies of Reading*, *18*(1), 22-37.

Pianta, R. C., Belsky, J., Vandergrift, N., Houts, R., & Morrison, F. J. (2008). Classroom effects on children's achievement trajectories in elementary school. *American Educational Research Journal*, *45*(2), 365-397.

Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, *82*(1), 33-40.

Pressley, M., & Allington, R. (1999). What should reading instructional research be the research of? *Issues in Education*, *5*(1), 1-35.

Quirk, M. P., & Schwanenflugel, P. J. (2004). Do supplemental remedial reading programs address the motivational issues of struggling readers? An analysis of five popular programs. *Literacy Research and Instruction*, *43*(3), 1-19.

Reschly, A. L. (2010). Reading and school completion: Critical connections and Matthew effects. *Reading & Writing Quarterly*, *26*(1), 67-90.

Reschly, A. L., & Christenson, S. L. (2012). Jingle, jangle, and conceptual haziness: Evolution and future directions of the engagement construct. In S. Christenson, A. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 3-19). New York, NY: Springer.

Reyes, M. R., Brackett, M. A., Rivers, S. E., White, M., & Salovey, P. (2012). Classroom emotional climate, student engagement, and academic achievement. *Journal of Educational Psychology*, *104*(3), 700-712.

Rimm-Kaufman, S. E., Curby, T. W., Grimm, K. J., Nathanson, L., & Brock, L. L. (2009). The contribution of children's self-regulation and classroom quality to children's adaptive behaviors in the kindergarten classroom. *Developmental Psychology*, *45*(4), 958.

Rosenholtz, S. J., & Simpson, C. (1984). The formation of ability conceptions: Developmental trend or social construction? *Review of Educational Research*, *54*(1), 31-63.

Russell, M., Bebell, D., & Higgins, J. (2004). Laptop learning: A comparison of teaching and learning in upper elementary classrooms equipped with shared carts of laptops and permanent 1:1 laptops. *Journal of Educational Computing Research*, *30*(4), 313-330.

Ryan, A. M., & Patrick, H. (2001). The classroom social environment and changes in adolescents' motivation and engagement during middle school. *American Educational Research Journal*, *38*(2), 437-460.

Ryan, R. M., & Deci, E. L. (2009). Promoting self-determined school engagement. In K. Wentzel & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 171-195). New York, NY: Routledge.

Saarnio, D. A., Oka, E. R., & Paris, S. G. (1990). Developmental predictors of children's reading comprehension. In T. H. Carr & B. A. Levy (Eds.), *Reading and its development: Component skills approaches* (pp. 57-79). San Diego, CA: Academic Press.

Sandholtz, J. H., Ringstaff, C., & Dwyer, D. C. (1997). *Teaching with technology: Creating student-centered classrooms.* New York, NY: Teachers College Press.

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.

Schiefele, U., Schaffner, E., Möller, J., & Wigfield, A. (2012). Dimensions of reading motivation and their relation to reading behavior and competence. *Reading Research Quarterly*, *47*(4), 427-463.

Schunk, D. H. (1991). Self-efficacy and academic motivation. *Educational psychologist*, *26*(3-4), 207-231.

Schunk, D. H. (2003). Self-efficacy for reading and writing: Influence of modeling, goal setting, and self-evaluation. *Reading &Writing Quarterly*, *19*(2), 159-172.

Schunk, D. H., & Zimmerman, B. J. (2007). Influencing children's self-efficacy and self-regulation of reading and writing through modeling. *Reading & Writing Quarterly*, *23*, 7-25.

Sideridis, G., Mouzaki, A., Simos, P., & Protopapas, A. (2006). Classification of students with reading comprehension difficulties: The roles of motivation, affect, and psychopathology. *Learning Disability Quarterly*, *29*, 159-180. doi:10.2307 /30035505

Skinner, E. A., & Belmont, M. J. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology*, *85*(4), 571-581.

Skinner, E. A., Furrer, C., Marchand, G., & Kindermann, T. (2008). Engagement and disaffection in the classroom: Part of a larger motivational dynamic? *Journal of Educational Psychology*, *100*(4), 765.

Skinner, E. A., Kindermann, T. A., & Furrer, C. J. (2009). A motivational perspective on engagement and disaffection conceptualization and assessment of children's behavioral and emotional participation in academic activities in the classroom. *Educational and Psychological Measurement*, *69*(3), 493-525.

Skinner, E. A., Wellborn, J. G., & Connell, J. P. (1990). What it takes to do well in school and whether I've got it: A process model of perceived control and children's engagement and achievement in school. *Journal of Educational Psychology*, *82*(1), 22-32.

Solheim, O. J. (2011). The impact of reading self-efficacy and task value on reading comprehension scores in different item formats. *Reading Psychology*, *32*, 1-27. doi:10.1080/02702710903256601

Somers, M. A., Corrin, W., Sepanik, S., Salinger, T., Levin, J., & Zmach, C. (2010). *The Enhanced Reading Opportunities Study final report: The impact of supplemental literacy courses for struggling ninth-grade readers* (NCEE 2010-4021). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from http://files.eric.ed.gov/fulltext/ED511811.pdf

Souvignier, E., & Mokhlesgerami, J. (2006). Using self-regulation as a framework for implementing strategy instruction to foster reading comprehension. *Learning and Instruction*, *16*(1), 57-71.

Stanovich, P. J., & Jordan, A. (1998). Canadian teachers' and principals' beliefs about inclusive education as predictors of effective teaching in heterogeneous classrooms. *The Elementary School Journal*, *98*(3), 221-238.

Stefanou, C. R., Perencevich, K. C., DiCintio, M., & Turner, J. C. (2004). Supporting autonomy in the classroom: Ways teachers encourage student decision making and ownership. *Educational Psychologist*, *39*(2), 97-110.

Steinberg, L., Brown, B. B., & Dornbusch, S. M. (1997). *Beyond the classroom*. New York, NY: Simon and Schuster.

Strambler, M. J., & Weinstein, R. S. (2010). Psychological disengagement in elementary school among ethnic minority students. *Journal of Applied Developmental Psychology*, *31*(2), 155-165.

Taylor, B. M., Pearson, P. D., Clark, K., & Walpole, S. (2000). Effective schools and accomplished teachers: Lessons about primary-grade reading instruction in low-income schools. *The Elementary School Journal*, 121-165.

Tollefson, N., Tracy, D. B., Johnsen, E. P., Farmer, A. W., & Buenning, M. (1984). Goal setting and personal responsibility training for LD adolescents. *Psychology in the Schools*, *21*(2), 224-233.

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.

Torgesen, J. K., Wagner, R. K., & Rashotte, C. A. (1999). *Test of Word Reading Efficiency* (TOWRE). Austin, TX: Pro-ed.

Turner, J. C. (1995). The influence of classroom contexts on young children's motivation for literacy. *Reading Research Quarterly, 30,* 410-441.

Volpe, R. J., DiPerna, J. C., Hintze, J. M., & Shapiro, E. S. (2005). Observing students in classroom settings: A review of seven coding schemes. *School Psychology Review*, *34*(4), 454-474.

Walker, B. J. (2003). The cultivation of student self-efficacy in reading and writing. *Reading & Writing Quarterly*, *19*(2), 173-187.

Wang, M. C., Haertel, G. D., & Walberg, H. J. (1993). Toward a knowledge base for school learning. *Review of Educational Research*, *63*(3), 249-294.

Watson, S. M. R., Gable, R. A., Gear, S. B., & Hughes, K. C. (2012). Evidence-based strategies for improving the reading comprehension of secondary students: Implications for students with learning disabilities. *Learning Disabilities Research and Practice*, *27*, 79-89. doi:10.1111/j.1540-5826.2012.00353.x

Wigfield, A., Eccles, J. S., & Rodriguez, D. (1998). The development of children's motivation in school contexts. *Review of Research in Education*, 73-118.

Wigfield, A., & Guthrie, J. T. (1997). Relations of children's motivation for reading to the amount and breadth or their reading. *Journal of Educational Psychology*, *89*(3), 420.

Wigfield, A., Guthrie, J. T., Perencevich, K. C., Taboada, A., Klauda, S. L., McRae, A., & Barbosa, P. (2008). Role of reading engagement in mediating effects of reading comprehension instruction on reading outcomes. *Psychology in the Schools*, *45*(5), 432-445.

Willms, J. D. (2003). Literacy proficiency of youth: Evidence of converging socioeconomic gradients. *International Journal of Educational Research, 39*(3), 247-252.

Wisconsin RtI Center. (2014). *High quality instruction*. Retrieved from http://www.wisconsinrticenter.org/parents-and-family/understanding-rti/high-quality-instruction.html

Wolters, C. A., Denton, C. A., York, M. J., & Francis, D. J. (2013). Adolescents' motivation for reading: Group differences and relation to standardized achievement. *Reading and Writing*, *27*(3), 1-31.

Yazzie-Mintz, E. (2007). *Voices of students on engagement: A report on the 2006 High School Survey of Student Engagement*. Retrieved from http://www.indiana.edu /~ceep/hssse/images/HSSSE_2009_Report.pdf

Supplemental Sources

Studies included in the analysis for Study 1.

Alfassi, M. (2004). Reading to learn: Effects of combined strategy instruction on high school students. *Journal of Educational Research, 97*(4), 171.

Alfassi, M. (2009). The efficacy of a dialogic learning environment in fostering literacy. *Reading Psychology, 30*(6), 539-563.

Allinder, R. M., Dunse, L., Brunken, C. D., & Obermiller-Krolikowski, H. (2001). Improving fluency in at-risk readers and students with learning disabilities. *Remedial and Special Education, 22*(1), 48-54.

Berkeley, S., Marshak, L., Mastropieri, M. A., & Scruggs, T. E. (2011). Improving student comprehension of social studies text: A self-questioning strategy for inclusive middle school classes. *Remedial and Special Education, 32*(2), 105-113.

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.

Berkeley, S., & Riccomini, P. J. (2013). QRAC-the-code: A comprehension monitoring strategy for middle school social studies textbooks. *Journal of Learning Disabilities, 46*(2), 154-165.

Biggs, M. C., Homan, S. P., Dedrick, R., Minick, V., & Rasinski, T. (2008). Using an interactive singing software program: A comparative study of struggling middle school readers. *Reading Psychology, 29*(3), 195-213.

Boyle, J. R. (2000). The effects of a venn diagram strategy on the literal, inferential, and relational comprehension of students with mild disabilities. *Learning Disabilities: A Multidisciplinary Journal, 10*(1), 5-13.

Brooks, G., Miles, J. N. V., Torgerson, C. J., & Torgerson, D. J. (2006). Is an intervention using computer software effective in literacy learning? A randomized controlled trial. *Educational Studies, 32*(2), 133-143.

Burns, M. K., Hodgson, J., Parker, D. C., & Fremont, K. (2011). Comparison of the effectiveness and efficiency of text previewing and preteaching keywords as small-group reading comprehension strategies with middle-school students. *Literacy Research and Instruction, 50*(3), 241-252.

Calhoon, M. B. (2005). Effects of a peer-mediated phonological skill and reading comprehension program on reading skill acquisition for middle school students with reading disabilities. *Journal of Learning Disabilities, 38*(5), 424-433.

Calhoon, M. B., Sandow, A., & Hunter, C. V. (2010). Reorganizing the instructional reading components: Could there be a better way to design remedial reading programs to maximize middle school students with reading disabilities' response to treatment? *Annals of Dyslexia, 60*(1), 57-85.

Cantrell, S. C., Almasi, J. F., Carter, J. C., Rintamaa, M., & Madden, A. (2010). The impact of a strategy-based intervention on the comprehension and strategy use of struggling adolescent readers. *Journal of Educational Psychology, 102*(2), 257-280.

Chamberlain, A., Daniels, C., Madden, N. A., & Slavin, R. E. (2007). A randomized evaluation of the success for all middle school reading program. *Middle Grades Research Journal, 2*(1), 1-21.

Cromley, J. G., Bergey, B. W., Fitzhugh, S., Newcombe, N., Wills, T. W., Shipley, T. F., & Tanaka, J. C. (2013). Effects of three diagram instruction methods on transfer of diagram comprehension skills: The critical role of inference while learning. *Learning and Instruction, 26*, 45-58.

Cuevas, J. A., Russell, R. L., & Irving, M. A. (2012). An examination of the effect of customized reading modules on diverse secondary students' reading comprehension and motivation. *Educational Technology Research and Development, 60*(3), 445-467.

Denner, P. R., Rickards, J. P., & Albanese, A. J. (2003). The effect of story impressions preview on learning from narrative text. *Journal of Experimental Education, 71*(4), 313-332.

Denton, C. A., Wexler, J., Vaughn, S., & Bryan, D. (2008). Intervention provided to linguistically diverse middle school students with severe reading difficulties. *Learning Disabilities Research & Practice, 23*(2), 79-89.

DiCecco, V. M., & Gleason, M. M. (2002). Using graphic organizers to attain relational knowledge from expository text. *Journal of Learning Disabilities, 35*(4), 306-320.

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.

Faggella-Luby, M., Schumaker, J. S., & Deshler, D. D. (2007). Embedded learning strategy instruction: Story-structure pedagogy in heterogeneous secondary literature classes. *Learning Disability Quarterly, 30*(2), 131-147.

Fall, R., Webb, N. M., & Chudowsky, N. (2000). Group discussion and large-scale language arts assessment: Effects on students' comprehension. *American Educational Research Journal, 37*(4), 911-941.

Fogarty, M., Oslund, E., Simmons, D., Davis, J., Simmons, L., Anderson, L., . . . Roberts, G. (2014). Examining the effectiveness of a multicomponent reading comprehension intervention in middle schools: A focus on treatment fidelity. *Educational Psychology Review, 26*(3), 425-449. doi:10.1007/s10648-014-9270-6

Gegner, J. A., Mackay, D. H. J., & Mayer, R. E. (2009). Computer-supported aids to making sense of scientific articles: Cognitive, motivational, and attitudinal effects. *Educational Technology Research and Development, 57*(1), 79-97.

Given, B. K., Wasserman, J. D., Chari, S. A., Beattie, K., & Eden, G. F. (2008). A randomized, controlled study of computer-based intervention in middle school struggling readers. *Brain and Language, 106*(2), 83-97.

Graves, A. W., Brandon, R., Duesbery, L., McIntosh, A., & Pyle, N. B. (2011). The effects of tier 2 literacy instruction in sixth grade: Toward the development of a response-to-intervention model in middle school. *Learning Disability Quarterly, 34*(1), 73-86.

Graves, A. W., Duesbery, L., Pyle, N. B., Brandon, R. R., & McIntosh, A. S. (2011). Two studies of tier II literacy development: Throwing sixth graders a lifeline. *Elementary School Journal, 111*(4), 641-661.

Guastello, E. F., Beasley, T. M., & Sinatra, R. C. (2000). Concept mapping effects on science content comprehension of low-achieving inner-city seventh graders. *Remedial and Special Education, 21*(6), 356-365.

Guthrie, J. T., Klauda, S. L., & Ho, A. N. (2013). Modeling the relationships among reading instruction, motivation, engagement, and achievement for adolescents. *Reading Research Quarterly, 48*(1), 9-26.

Hasselbring, T. S., & Goin, L. I. (2004). Literacy instruction for older struggling readers: What is the role of technology? *Reading and Writing Quarterly, 20*(2), 123-144.

Jitendra, A. K., Hoppes, M. K., & Xin, Y. P. (2000). Enhancing main idea comprehension for students with learning problems: The role of a summarization

strategy and self-monitoring instruction. *Journal of Special Education, 34*(3), 127-139.

Keehn, S., Harmon, J., & Shoho, A. (2008). A study of readers theater in eighth grade: Issues of fluency, comprehension, and vocabulary. *Reading & Writing Quarterly, 24*(4), 335-362.

Kim, A., Vaughn, S., Klingner, J. K., Woodruff, A. L., Reutebuch, C. K., & Kouzekanani, K. (2006). Improving the reading comprehension of middle school students with disabilities through computer-assisted collaborative strategic reading. *Remedial and Special Education, 27*(4), 235-249.

Lang, L., Torgesen, J., Vogel, W., Chanter, C., Lefsky, E., & Petscher, Y. (2009). Exploring the relative effectiveness of reading interventions for high school students. *Journal of Research on Educational Effectiveness, 2*(2), 149-175.

Lange, A. A., McPhillips, M., Mulhern, G., & Wylie, J. (2006). Assistive software tools for secondary-level students with literacy difficulties. *Journal of Special Education Technology, 21*(3), 13-22.

Lesaux, N. K., Kieffer, M. J., Faller, S. E., & Kelley, J. G. (2010). The effectiveness and ease of implementation of an academic vocabulary intervention for linguistically diverse students in urban middle schools. *Reading Research Quarterly, 45*(2), 196-228.

Liang, L. A. (2011). Scaffolding middle school students' comprehension and response to short stories. *RMLE Online: Research in Middle Level Education, 34*(8), 1-16.

Lovett, M. W., Lacerenza, L., De Palma, M., & Frijters, J. C. (2012). Evaluating the efficacy of remediation for struggling readers in high school. *Journal of Learning Disabilities, 45*(2), 151-169.

Macaruso, P., & Rodman, A. (2009). Benefits of computer-assisted instruction for struggling readers in middle school. *European Journal of Special Needs Education, 24*(1), 103-113.

Maninger, R. M. (2006). Successful technology integration: Student test scores improved in an English literature course through the use of supportive devices. *TechTrends: Linking Research and Practice to Improve Learning, 50*(5), 37-45.

Mastropieri, M. A., Scruggs, T. E., Mohler, L. J., Beranek, M. L., Spencer, V., Boon, R. T., & Talbott, E. (2001). Can middle school students with serious reading difficulties help each other and learn anything? *Learning Disabilities: Research & Practice, 16*(1), 18-27.

McCallum, R. S., Krohn, K. R., Skinner, C. H., Hilton-Prillhart, A., Hopkins, M., Waller, S., & Polite, F. (2011). Improving reading comprehension of at-risk high-school students: The ART of reading program. *Psychology in the Schools, 48*(1), 78-86.

McNamara, D. S., O'Reilly, T. P., Best, R. M., & Ozuru, Y. (2006). Improving adolescent students' reading comprehension with iSTART. *Journal of Educational Computing Research, 34*(2), 147-171.

Mercer, C. D., Campbell, K. U., Miller, M. D., Mercer, K. D., & Lane, H. B. (2000). Effects of a reading fluency intervention for middle schoolers with specific learning disabilities. *Learning Disabilities: Research & Practice, 15*(4), 179-189.

Morocco, C. C., Hindin, A., Mata-Aguilar, C., & Clark-Chiarelli, N. (2001). Building a deep understanding of literature with middle-grade students with learning disabilities. *Learning Disability Quarterly, 24*(1), 47-58.

Nokes, J. D., Dole, J. A., & Hacker, D. J. (2007). Teaching high school students to use heuristics while reading historical texts. *Journal of Educational Psychology, 99*(3), 492-504.

Papalewis, R. (2004). Struggling middle school readers: Successful, accelerating intervention. *Reading Improvement, 41*(1), 24.

Penney, C. G. (2002). Teaching decoding skills to poor readers in high school. *Journal of Literacy Research, 34*(1), 99-118.

Radcliffe, R., Caverly, D., Hand, J., & Franke, D. (2008). Improving reading in a middle school science classroom. *Journal of Adolescent & Adult Literacy, 51*(5), 398-408.

Redford, J. S., Thiede, K. W., Wiley, J., & Griffin, T. D. (2012). Concept mapping improves metacomprehension accuracy among 7th graders. *Learning and Instruction, 22*(4), 262-270.

Reglin, G., Cameron, H., & Losike-Sedimo, N. (2012). Effects of a parent support reading intervention on seventh-grade at-risk students' reading comprehension scores. *Reading Improvement, 49*(1), 17-27.

Roberts, G., Fletcher, J. M., Stuebing, K. K., Barth, A. E., & Vaughn, S. (2013). Treatment effects for adolescent struggling readers: An application of moderated mediation. *Learning and Individual Differences, 23*, 10-21.

Roberts, G., Vaughn, S., Fletcher, J., Stuebing, K., & Barth, A. (2013). Effects of a response-based, tiered framework for intervening with struggling readers in middle school. *Reading Research Quarterly, 48*(3), 237-254.

Rogevich, M. E., & Perin, D. (2008). Effects on science summarization of a reading comprehension intervention for adolescents with behavior and attention disorders. *Exceptional Children, 74*(2), 135-154.

Schorzman, E. M., & Cheek, E. H. (2004). Structured strategy instruction: Investigating an intervention for improving sixth-graders' reading comprehension. *Reading Psychology: An International Quarterly, 25*(1), 37-60.

Shapley, K., Sheehan, D., Maloney, C., & Caranikas-Walker, F. (2011). Effects of technology immersion on middle school students' learning opportunities and achievement. *Journal of Educational Research, 104*(5), 299-315.

Shippen, M. E., Houchins, D. E., Calhoon, M. B., Furlow, C. F., & Sartor, D. L. (2006). The effects of comprehensive school reform models in reading for urban middle school students with disabilities. *Remedial and Special Education, 27*(6), 322-328.

Shippen, M. E., Houchins, D. E., Steventon, C., & Sartor, D. (2005). A comparison of two direct instruction reading programs for urban middle school students. *Remedial and Special Education, 26*(3), 175-182.

Silva, J. P., White, G. P., & Yoshida, R. K. (2011). The direct effects of principal-student discussions on eighth grade students' gains in reading achievement: An experimental study. *Educational Administration Quarterly, 47*(5), 772-793.

Simmons, D., Fogarty, M., Oslund, E. L., Simmons, L., Hairrell, A., Davis, J., . . . Fall, A. (2014). Integrating content knowledge-building and student-regulated comprehension practices in secondary English language arts classes. *Journal of Research on Educational Effectiveness, 7*(4), 309-330. doi:10.1080/19345757 .2013.836766

Snow, C. E., Lawrence, J. F., & White, C. (2009). Generating knowledge of academic language among urban middle school students. *Journal of Research on Educational Effectiveness, 2*(4), 325-344.

Spencer, S. A., & Manis, F. R. (2010). The effects of a fluency intervention program on the fluency and comprehension outcomes of middle-school students with severe reading deficits. *Learning Disabilities Research & Practice, 25*(2), 76-86.

Srivastava, P., & Gray, S. (2012). Computer-based and paper-based reading comprehension in adolescents with typical language development and language-learning disabilities. *Language, Speech, and Hearing Services in Schools, 43*(4), 424-437.

Swanson, T. J., Hodson, B. W., & Schommer-Aikins, M. (2005). An examination of phonological awareness treatment outcomes for seventh-grade poor readers from a bilingual community. *Language, Speech, and Hearing Services in Schools, 36*(4), 336-345.

Twyman, T., & Tindal, G. (2006). Using a computer-adapted, conceptually based history text to increase comprehension and problem-solving skills of students with disabilities. *Journal of Special Education Technology, 21*(2), 5-16.

Vaughn, S., Cirino, P. T., Wanzek, J., Wexler, J., Fletcher, J. M., Denton, C. D., . . . Francis, D. J. (2010). Response to intervention for middle school students with reading difficulties: Effects of a primary and secondary intervention. *School Psychology Review, 39*(1), 3-21.

Vaughn, S., Klingner, J. K., Swanson, E. A., Boardman, A. G., Roberts, G., Mohammed, S. S., & Stillman-Spisak, S. (2011). Efficacy of collaborative strategic reading with middle school students. *American Educational Research Journal, 48*(4), 938-964.

Vaughn, S., Roberts, G., Klingner, J. K., Swanson, E. A., Boardman, A., Stillman-Spisak, S., . . . Leroux, A. J. (2013). Collaborative strategic reading: Findings from experienced implementers. *Journal of Research on Educational Effectiveness, 6*(2), 137-163.

Vaughn, S., Swanson, E. A., Roberts, G., Wanzek, J., Stillman-Spisak, S., Solis, M., & Simmons, D. (2013). Improving reading comprehension and social studies knowledge in middle school. *Reading Research Quarterly, 48*(1), 77-93.

Vaughn, S., Wanzek, J., Wexler, J., Barth, A., Cirino, P. T., Fletcher, J., . . . Francis, D. (2010). The relative effects of group size on reading progress of older students with reading difficulties. *Reading and Writing: An Interdisciplinary Journal, 23*(8), 931-956.

Vaughn, S., Wexler, J., Leroux, A., Roberts, G., Denton, C., Barth, A., & Fletcher, J. (2012). Effects of intensive reading intervention for eighth-grade students with persistently inadequate response to intervention. *Journal of Learning Disabilities, 45*(6), 515-525.

Vaughn, S., Wexler, J., Roberts, G., Barth, A. A., Cirino, P. T., Romain, M. A., . . . Denton, C. A. (2011). Effects of individualized and standardized interventions on middle school students with reading disabilities. *Exceptional Children, 77*(4), 391-407.

Wanzek, J., Vaughn, S., Roberts, G., & Fletcher, J. M. (2011). Efficacy of a reading intervention for middle school students with learning disabilities. *Exceptional Children, 78*(1), 73-87.

Warren-Kring, B., & Rutledge, V. C. (2011). Adolescents' comprehension and content area education students' perceptions: Benefits from one-on-one tutoring. *Teacher Educator, 46*(3), 244-261.

Wexler, J., Vaughn, S., Roberts, G., & Denton, C. A. (2010). The efficacy of repeated reading and wide reading practice for high school students with severe reading disabilities. *Learning Disabilities Research & Practice, 25*(1), 2-10.

Wilder, A. A., & Williams, J. P. (2001). Students with severe learning disabilities can learn higher order comprehension skills. *Journal of Educational Psychology, 93*(2), 268.

APPENDIX A

Teacher Practices	Example Teaching/Learning Activities
Autonomy support (promotion of independent effort)	Student choice of topics to explore or character(s) to focus on; Student choice of text to read; Student input into instructional decisions or tasks; Student choice for task completion; Student construction of rubrics for evaluation of work
Providing interesting texts (a range of materials that expand around the theme)	Linking texts and multimedia; merging texts, texts illustrations, and animations in learning; Connecting themes from popular genre and classical literature; Using culturally responsive texts addressing adolescent characters, issues, and social crises; Diversity of text difficult in the classroom.
Strategy instruction	Direct modeling, scaffolding, and guided practice for reading comprehension strategies such as questioning, searching, summarizing, using graphic organizers, comprehension monitoring, and critical evaluation, identifying the main idea, inference making, critical evaluation.
Praise and feedback	Teachers provide praise to students; The use of extrinsic rewards during the instructional time; Providing formal and informal feedback to students; Reviewing work with students; Evaluation of students using technology.
Providing Relevance (making personal connections of content to students)	Making a connection between text/topic and students' personal lives; Activating students' background knowledge; Multimedia to increase student interest and connect material to students' background knowledge
Collaboration support	Teams (2 or more people) work toward engaging in discourse; Writing a summary together; Positive interdependence (students need each other to reach shared goal); Use of individual expertise to learn and share with group; Partner Dialogue to discuss text; Students reading together. Building norms for interaction and evaluate these regularly; Require full participation in teams; Student led discussion groups.
Learning and Knowledge Goals	Organizing reading/language arts around a theme. Reading tests about one conceptual theme. Constructing instructional goals around a specific topic within a knowledge domain. Using a driving question that reflects learning and knowledge goals.
Real-World Interactions	Making connections between the academic curriculum and the personal experiences of the learners using hands on activities. Using stimulating hands on activities that connect students to content they are learning. Sensory interaction (e.g., seeing, hearing, feeling, or smelling) with tangible objects or events (e.g., observing hermit crabs, reenacting a historical event).
Technology	Using computers or iPads to deliver instruction, showing videos, video modeling, audio reading, computer-based assessment.

APPENDIX B

Cognitive Engagement Related Questions from MSLQ	Behavioral Engagement Related Questions from MSLQ
When I do homework, I try to remember what the teacher said in class so I can answer the questions correctly. (Metacognitive Self-Regulation)	When work is hard, I either give up or study only the easy parts. (Effort Regulation)
When I study I put important ideas into my own words. (Metacognitive Self-Regulation)	I always try to understand what the teacher is saying even if it doesn't make sense. (Effort Regulation)
When I study for a test, I try to remember as many facts as I can. (Metacognitive Self-Regulation)	Even when study materials are dull and uninteresting, I keep working until I finish. (Effort Regulation)
When I read material for this class, I say the words over and over to myself to help me remember. (Metacognitive Self-Regulation)	I work hard to get a good grade even when I don't like a class. (Effort Regulation)
I ask myself questions to make sure I know the material I have been studying. (Metacognitive Self-Regulation)	
Before I begin studying, I think about the things I will need to do to learn. (Metacognitive Self-Regulation)	
I often find I have been reading for class but don't know what it is all about. (Metacognitive Self-Regulation)	
I find that when the teacher is talking I think of other things and don't really listen to what is being said. (Metacognitive Self-Regulation)	
When I'm reading, I stop once in a while and go over what I have read. (Metacognitive Self-Regulation)	