Cognition, Motivation, and Engagement as Factors in the Reading Comprehension of Dual Language Learners and English Speakers: Unified or Distinctive Models?

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Abstract

Previous studies offer mixed evidence regarding whether a unified model of reading comprehension predictors applies to Dual Language Learners (DLLs) and English Speakers (ESs), or whether distinctive models across language groups are empirically supported. The present study adds another dimension to this body of work by examining multiple reading engagement and motivation predictors alongside cognitive predictors of reading comprehension. The participants – 188 DLLs and 166 ESs in the fourth and fifth grades – completed measures of word identification, linguistic comprehension, cognitive strategy use, internal motivation, and extrinsic motivation, and their teachers rated their reading engagement. Language status did not moderate the relations of any predictors with either concurrent reading comprehension performance or growth of reading comprehension across the school year, supporting a unified model of reading comprehension for DLLs and ESs. Word identification and linguistic comprehension showed the strongest relations with concurrent reading comprehension and growth. While the role of reading engagement was less prominent, it was demonstrated to be a plausible partial mediator of the relation of word identification with concurrent reading comprehension.

Keywords: cognitive strategies, Dual Language Learners, engagement, motivation, reading comprehension

Cognition, Engagement, and Motivation as Factors in the Reading Comprehension of Dual Language Learners and English Speakers: Unified or Distinctive Models?

According to the empirically and theoretically driven perspective of the RAND panel, reading comprehension is "the process of simultaneously extracting and constructing meaning through interaction and involvement with written language" in which the reader, text, and activity are key elements (Snow, 2002, p. 11). Further, in delineating the characteristics of the reader, the definition included general cognitive capacities and abilities (e.g., memory, inferencing), types of knowledge (e.g., linguistic, vocabulary), and motivation (e.g., self-efficacy, interest in the text being read). Indeed, studies have shown that a variety of cognitive, engagement, and motivation variables (e.g., Taboada, Tonks, Wigfield, & Guthrie, 2009; Pressley & Harris, 2006; Kim, 2017; Wolters, Denton, York, & Francis, 2014) predict reading comprehension performance.

Yet there is limited research on how cognitive, engagement, and motivation variables contribute to reading comprehension when controlling for each other, knowledge which aids in formulating models of reading comprehension. One critical question in developing such models is whether the same variables predict reading comprehension, and do so to the same extent, for Dual Language Learners (DLLs; i.e., students developing English proficiency who speak another language at home) and English Speakers (ESs; i.e., either native English speakers or students whose home language is English). The answer to this question holds important implications for meeting the instructional needs of DLLs in American schools, as well as those of ESs. The variables examined are all known *malleable* contributors to reading comprehension in ESs, and understudied in DLLs. Thus, understanding the extent to which they contribute to reading comprehension in each language group can help determine targets for intervention for students struggling with reading comprehension, and whether they should be the same or different for DLLs and ESs.

There has been work toward developing models of the cognitive components of reading comprehension in DLLs that contends that cognitive variables relate similarly to reading comprehension in several respects (e.g., Kieffer & Vukovic, 2012; Lesaux Rupp, & Siegel, 2007); a possible exception is vocabulary (e.g., Proctor & Louick, 2018). There has been limited consideration, however, of the role of engagement and motivation in DLLs' reading comprehension. By engagement, we mean active, observable involvement in a domain, such as reading, and, by motivation, the internal forces that activate and propel behavior (Guthrie & Klauda, 2016; Reeve, 2012). To our knowledge, only one study has explored how language and motivation predict reading comprehension within the same models, showing that self-efficacy but neither intrinsic nor extrinsic motivation did so in both DLLs and ESs (Proctor, Daley, Louick, Leider & Gardner, 2014). This study was conducted with middle school students with disabilities, thus leaving much room for similar investigations with other samples.

In the current study, the overarching question is whether a *unified model* in which the relative contributions of cognitive, engagement, motivation variables to reading comprehension are comparable for DLLs and ESs is warranted, or whether *distinctive models*, characterized by differential relations of these variables with reading comprehension across language groups, is more appropriate. Following research that compares DLLs' and ESs' literacy processes, we focus on the late elementary grades (Grades 4 and 5) (e.g., Cho, Capin, Roberts, Roberts, & Vaughn, 2019; Farnia & Geva, 2013; Proctor, Daley, Louick, Leider, & Gardner, 2014). This is a critical period when the reading comprehension gap between DLLs and ESs is most evident and when the challenges of comprehending texts become compounded by language and cognitive factors as well as engagement and/or motivation challenges (e.g., Kieffer, 2008; Mancilla-Martinez & Lesaux, 2010; Taboada Barber et al., 2015). We are particularly interested in how reading engagement and motivation predict reading comprehension alongside cognitive and language variables, as a recent systematic review reported that just 15 studies conducted since 2000 have done so in elementary students (Orellana García, 2018). Further, only one of these studies examined second language learners – and they were not English but Dutch learners (Netten, Droop, & Verhoeven, 2011). Additionally, only three studies, reported variance explained by both cognitive and language predictors alongside motivation (Orellana Garcia, 2018). Further, extant work has focused on either engagement or motivation but not both (e.g., Proctor et al., 2014; Taboada, Townsend, & Boynton, 2013). We address this dearth by comparing how upper elementary DLLs' and ESs' reading word identification, linguistic comprehension, cognitive strategy use, reading engagement, and reading motivation relate to their reading comprehension performance and growth over the school year. We focus on how these variables predict growth in addition to their relations with concurrent performance because of evidence, as discussed later, that DLLs often show slower growth in reading comprehension than ESs (e.g., Farnia & Geva, 2013; Proctor et al., 2014). Examining whether the focal factors differentially predict growth, then, may shed light on why there are differences in amount of growth, and how to better equalize growth across language groups.

Word Identification, Linguistic Comprehension, and Reading Comprehension

Studies have long demonstrated that difficulties in either word reading or linguistic comprehension weaken reading comprehension in ESs (e.g., Brady & Shankweiler, 1991; Catts, Adlof, & Weismer, 2006). With regard to linguistic comprehension (defined in prior studies [e.g., Cho et al., 2019] and currently as a combination of listening comprehension and vocabulary), several studies have indicated that the most prominent indicator of linguistic proficiency is vocabulary knowledge (Stahl & Fairbanks, 1986; Proctor, Carlo, August, & Snow, 2005). Moreover, vocabulary knowledge has been contended to be the best predictor of reading comprehension, a premise well-established in research on monolingual ESs (Freebody & Anderson, 1983). In DLLs, English vocabulary appears critical to reading in English, as it makes independent contributions to reading comprehension across the elementary and middle school grades (e.g., Carlisle, Beeman, Davis, & Spharim, 1999; Carlo et al., 2004).

Listening comprehension also has predicted concurrent performance plus growth in English reading comprehension, especially in Spanish-speaking DLLs (Royer & Carlo. 1991). Moreover, research on the simple view of reading – which asserts that reading skill is dependent essentially on word decoding and listening comprehension – has shown that both word reading and listening comprehension were powerful predictors of English reading comprehension in a longitudinal study of Spanish-English bilingual students in Grades 1-4 (Hoover & Gough, 1990). Further the combined effect of vocabulary and listening comprehension has appeared particularly strong for DLLs (Cho et al., 2019).

Altogether, based on extant research, it appears that linguistic comprehension may be a stronger predictor than word decoding and other cognitive predictors, especially in later stages of reading development for DLLs, while ESs may show a different pattern of the relative strength of cognitive predictors. For instance, a study of fourth graders with reading difficulties demonstrated that while linguistic comprehension was a stronger predictor of reading comprehension than word decoding for DLLs, the reverse was true for ESs (Cho et al., 2019). Also, a study of fifth graders showed that two variables which significantly predicted reading comprehension for DLLs – listening comprehension and syntactic skills – were not significant predictors for ESs (Geva & Farnia, 2012).

Cognitive Strategy Use and Reading Comprehension

Some students have poor reading comprehension despite adequate word identification and linguistic comprehension skills (e.g., Torppa et al., 2007). This suggests that other cognitive contributors should be examined. One such contributor receiving increasing attention is higher-order cognitive strategies, such as inference making and comprehension monitoring. In line with the Good Strategy User model, we view these strategies as cognitive processes that can be learned and employed consciously when necessary, though they become automatized in skilled, experienced readers (Pressley, Forrest-Pressley, Elliott-Faust, & Miller, 1985). As such, use of these strategies may be related to individual differences in such areas as executive function (e.g., attention, working memory), metacognitive ability, and self-regulation (Borkowski, Chan, & Muthukrishna, 2000; Roebers & Feurer, 2016). Inference making entails integrating textual information with other information from the text (local inferences) and information outside the text (global inferences); both inference types are needed to establish a coherent text representation (Cain & Oakhill, 1999, 2014). Comprehension monitoring refers to continuously checking one's own understanding while reading (Cain & Oakhill, 2007). This ability appears to improve as children grow older (Baker & Brown, 1984).

Cognitive strategies are well-established predictors of reading comprehension (e.g., National Reading Panel, 2000). Initial research examining verbal protocols showed that skilled readers strategically apply a repertoire of comprehension strategies before, during, and after reading (Pressley & Afflerbach, 1995). In longitudinal studies of ESs from 7 to 11 years, inference making and comprehension monitoring have predicted reading comprehension beyond prior reading comprehension and verbal ability (Oakhill & Cain, 2007, 2012; Perfetti, Landi, & Oakhill, 2005). Further, in seminal intervention studies, teaching students a combination of reading strategies has improved comprehension (e.g., Palincsar & Brown, 1984; Rosenshine & Meister, 1994).

Among DLLs, inferencing and comprehension monitoring have not been explored as reading comprehension predictors. Intervention work, however, has shown that middle school DLLs' history text comprehension improved as a result of multifaceted comprehension instruction including explicit strategy instruction as much as ESs' (Taboada Barber et al., 2015; Taboada Barber et al., 2018). Thus, investigating the role that cognitive strategies play vis à vis DLLs' engagement will help develop a comprehensive view of their reading comprehension. At this point, there is no basis for hypothesizing that cognitive strategies would predict reading comprehension differentially for DLLs and ESs.

Reading Engagement and Motivation in Relation to Reading Comprehension

In the reading engagement framework, engagement is the linchpin connecting student motivation with achievement (Guthrie & Klauda, 2016; Guthrie & Wigfield, 2000). Academic engagement in general and reading engagement in particular are often conceptualized as having multiple dimensions, such as affective, cognitive, and behavioral (Lutz, Guthrie, & Davis, 2006; Fredricks, Blumenfeld, & Paris, 2004; Guthrie & Wigfield, 2000; Reeve, 2012). Presently, we focus on the behavioral dimension, or students' observable devotion of time, effort, and persistence to reading activities (Guthrie & Klauda, 2016). Research using various indicators– for example, reading amount, print exposure, teacher ratings based on observed behavior – has shown that behavioral reading engagement predicts reading comprehension across Grades K-12 (e.g., Guthrie, Wigfield, Metsala, & Cox, 1999; Mol & Bus, 2011; Taboada, Tonks, Wigfield, &

Guthrie, 2009). However, limited research has examined the role of behavioral engagement in DLLs' reading comprehension. The only known relevant study focused on Grade 5 Asian DLLs and Grade 6 Hispanic DLLs (Taboada, Townsend, & Boynton, 2013). Within both groups, students with stronger language proficiency and science vocabulary were more behaviorally engaged readers – as captured by teacher ratings – and, in turn, greater engagement was associated with stronger reading comprehension.

Reading motivation refers to reading-related beliefs, values, and goals that drive individuals' reading (Baker & Wigfield, 1999; Schiefele, Schaffner, Möller, & Wigfield, 2012). In accord with general motivation theories, particularly self-determination theory, reading motivation dimensions have been categorized as either internal/intrinsic or external/extrinsic (Ryan & Deci, 2000; Schiefele et al., 2012). Herein we use the term *internal* to encompass intrinsic reasons for reading and self-efficacy. Intrinsically motivated individuals read because it is inherently enjoyable and satisfying (Guthrie & Wigfield, 2000; Schiefele & Schaffner, 2016). Specifically, we include the intrinsic dimensions of *involvement*, or reading because it produces feelings of absorption, and *curiosity,* or reading driven by topic interests (Baker & Wigfield, 1999; Schiefele & Schaffner, 2016). *Self-efficacy* refers to belief in one's ability to succeed in reading tasks, which some have be construed as a dimension of motivation (Baker & Wigfield, 1999; Guthrie, Klauda, & Ho, 2013; Guthrie & Wigfield, 2000). Others, however, consider it a motivation antecedent that contributes particularly to intrinsic motivation (Schiefele et al., 2012; Schiefele & Schaffner, 2016). Given that self-efficacy is a strongly established predictor of reading achievement in DLLs, it is of theoretical and practical importance to include it herein (Proctor et al., 2014; Taboada Barber et al., 2015; Taboada Barber et al., 2018).

Extrinsic or external motivation represents the drive to read because it leads to attaining goals or rewards external to the reading activity or content (Guthrie & Wigfield, 2000; Schiefele & Schaffner, 2016). We investigate the extrinsic dimensions of *competition* – reading to attain higher achievement levels than others – and *recognition* – reading to garner praise for reading performance (Baker & Wigfield, 1999; Schiefele & Schaffner, 2016).

In ESs, internal motivation has often moderately to strongly correlated with reading achievement, and been related to it directly in complex structural models (e.g., Baker & Wigfield, 1999; Wang & Guthrie, 2004). It has also related to reading achievement longitudinally from Grades 5 to 8 when controlling for SES and prior reading achievement (e.g., Froiland & Oros, 2013). In DLLs in the US, internal motivation has hardly been explored. In one study of middle school DLLs with reading disabilities intrinsic motivation did not predict reading comprehension, but self-efficacy did (Proctor et al., 2014). In another study, of U.S. students from Hispanic and Asian backgrounds, who were not necessarily DLLs, intrinsic motivation predicted reading comprehension in a model with several demographic predictors (Unrau & Schlackman, 2006).

Regarding extrinsic motivation and achievement, research overall indicates that it relates negatively to reading comprehension when internal motivation is controlled, including for ESs in the US (Schiefele et al., 2012; Wang & Guthrie, 2004). It did not significantly predict reading comprehension in either Proctor and colleagues' (2014) or Unrau and Schlackman's (2006) studies.

Comparing Reading Comprehension in Dual Language Learners and English Speakers

There is abundant empirical evidence that DLLs in their majority, but particularly Spanish-speaking DLLs in the US, are underachieving compared to their ES counterparts.

Starting in Grade 3, their relative reading comprehension decreases (e.g., Nakamoto, Lindsey, & Manis, 2007; Proctor et al., 2005). There is less empirical work comparing literacy trajectories in DLLs vis á vis their ES counterparts, yet findings replicate the reading comprehension decline for DLLs (e.g., Farnia & Geva, 2013; Kieffer, 2008; Proctor et al., 2014). One nuance to this trend is a study in which language minority speakers who had attained English proficiency showed literacy growth patterns similar to ESs' (Kieffer, 2008), while those still developing English proficiency grew more slowly, leading to large differences in reading achievement by fifth grade. These findings, however, do not address whether there is also differentiation in the prediction of reading comprehension performance or growth for DLLs and ESs, the focus of the present study.

Within studies focused on cognitive and language predictors of reading comprehension, similar correlations and predictions have been found between cognitive variables (e.g., naming speed and working memory) and language variables (i.e., vocabulary, syntactic knowledge, and linguistic comprehension) across language groups (e.g., Farnia & Geva, 213; Geva & Farnia, 2012). Furthermore, early predictors of reading comprehension (word decoding and listening comprehension) predict later reading comprehension comparably for DLLs and ESs (Kieffer & Vukovic, 2012; Lesaux et al., 2007). These findings support the unified view of reading comprehension, as does a study in which language status did not moderate the relations of motivation with comprehension performance in middle school students (Proctor et al., 2014). Nor did the study obtain any differential relations among cognitive predictors. However, out of nine studies (since 2000), which examined vocabulary as a predictor of reading comprehension in second language learners and monolinguals, seven studies favored the distinctive view, with six indicating that vocabulary was a stronger predictor for DLLs (Proctor & Louick, 2018).

Additionally, a recent study demonstrated that the combined effects of vocabulary and listening comprehension on reading comprehension were more pronounced than those of word decoding for DLLs but not for ESs, with all participants being Grade 4 struggling readers (Cho et al., 2019). Thus, there is mixed – and limited, especially with respect to cognitive strategies, engagement, and motivation – evidence for the unified and distinctive model perspectives. Thus, the present study includes the variables of cognitive strategies, engagement, and motivation, which have undergone scant investigation as predictors of reading comprehension in DLLs, alongside variables known to play important roles in reading comprehension for DLLs and ESs alike (word identification, vocabulary, and listening comprehension). In examining the contributions of these variables to reading comprehension performance and growth across subgroups similar in SES but distinct in language background, the present study furthers insight into which factors – and for which students – to potentially target in reading comprehension interventions.

Hypotheses and Research Questions

Two main hypotheses guided our work. First, we hypothesize that linguistic comprehension will predict concurrent reading comprehension performance and growth over the school year more strongly for DLLs than for ESs, supporting the distinctive models perspective. This follows the lexical quality hypothesis, which contends that meaning-based, high-quality lexical representations facilitate building a situational model from text via linguistic comprehension (Perfetti, 2007). Thus, students who have adequate English linguistic comprehension would be better equipped to build a situational model and a coherent representation of text than students weaker in or, who are still developing, English linguistic comprehension, such as DLLs (Cho et al., 2019). This hypothesis aligns with previous evidence indicating that linguistic comprehension makes a unique contribution to reading comprehension beyond word reading in DLLs – but not in ESs (e.g., Cho et al., 2019; Geva & Farnia, 2012). This hypothesis is also premised on the consideration that the DLL students in our study were in the midst of developing language proficiency (see the Participants section) and thus likely to vary considerably on our linguistic comprehension measure, as opposed to being language minority learners who had already attained English proficiency. In other words, the current DLL group was akin to Kieffer's (2008) group of language minority students who were not English proficient, and who showed a slower growth pattern for reading achievement than language minority students who were already English proficient (with reading achievement patterns similar to native English speakers). One source of these different growth patterns may be that cognitive variables (whether linguistic comprehension or other variables, such as executive functions) differentially predict reading comprehension for students still developing English proficiency, like the current DLL group, and for students who are English proficient.

Second, we hypothesize that engagement and motivation will contribute more weakly to DLLs' than ESs' reading comprehension, supporting the distinctive models perspective. For DLLs, who overall are at a lower linguistic comprehension level, motivation may facilitate increased effort, that is, time and attention devoted to making sense of text – or behavioral engagement. However, behavioral engagement may not result in improved reading comprehension performance if students do not meet a certain threshold of English proficiency that enables them to read the text fluently enough or understand word meanings such that they form an accurate text-base on which to apply strategies to construct deeper meaning from the text (Kintsch & Kintsch, 2005). In this sense, linguistic comprehension works as an enabling process for engagement and motivation to exert roles in reading comprehension. This hypothesis is consistent with findings with middle school DLLs indicating that reading engagement partially mediated relations between English language proficiency and reading comprehension for students at a relatively low English proficiency level, but fully mediated these relations for those at a higher English proficiency level (Taboada, Townsend, & Boynton, 2013).

The following research questions guided our study:

1. To what extent do DLLs and ESs in Grades 4 and 5 differ in their initial levels of reading comprehension, word identification, linguistic comprehension, cognitive strategies, and reading engagement?

2. How can relations of the language, cognitive, engagement, and motivational variables with reading comprehension be modelled?

    (a) Are the language and cognitive variables (i.e., word identification, linguistic comprehension, cognitive strategies), and reading engagement and motivation each unique predictors of the variance in concurrent reading comprehension performance?

    (b) Is it plausible that reading engagement mediates the relations of the language and cognitive variables and reading motivation with reading comprehension performance?

    (c) Are the language and cognitive variables and reading engagement unique predictors of reading comprehension growth?

In conjunction with addressing each part of Question 2, we also asked whether the relations were similar or different across language status. That is, we asked whether they supported unified or distinctive models of reading comprehension.

Method

Participants

The analysis sample included 354 students (188 DLLs, 166 ESs), in Grades 4 and 5 attending five elementary schools in different areas of one mid-Atlantic county. This sample includes all students in the focal grades who had parental permission to participate. Forty-three students with disabilities that impeded their participation in assessment sessions, and 37 students who were missing substantial amounts of data (as defined in the Analysis Overview) were excluded from analyses. All students were part of a longitudinal study examining language and cognitive skills in DLLs and ESs from Grades 1-5. The current study uses data from year 2 of the larger, 3-year longitudinal project and is different from the larger study in that (1) here we focus on cognitive *and* motivational contributions to reading comprehension within the academic year, a time span important for educational practice, and (2) we focus on fourth and fifth graders, a time during which increased reading demands and text complexity may impact engagement and motivation in more pronounced ways than in earlier grades (e.g., Kush, Watkins, & Brookhart, 2005).

Students had to meet two criteria to be designated DLLs. The first was performance at levels 3 to 5 on the WIDA (World-class Instructional Design and Assessment, a standardized English language proficiency measure given by the school district to determine DLL status. WIDA scores may range from 1 [entering] to 6 [reaching][1]). All children within the 3-5 range were receiving ESOL (English for Students of Other Languages) services. Students performing at levels 1 and 2 were excluded as they lacked the minimal level of English proficiency needed

[1] WIDA Level 1 consists of basic "use of words, phrases, or chunks of language when presented with one-step commands, directions, WH questions, or statements with visual graphic support" as well as pictorial academic language. Level 3 indicates "oral or written language with phonological, syntactic, or semantic errors that may impede the communication but retain much of its meaning when presented with oral or written, narrative or expository descriptions with occasional visual and graphic support." Level 5 denotes "oral or written language approaching comparability to that of English proficient peers when presented with grade level material."

to participate in assessment. The second criteria was home usage of a language besides English based on a student survey; that is, students needed to indicate that "I talk mostly in (another language)" at home with parents and siblings to be categorized as DLLs. Language usage (frequency and context of use) has been determined to be a reliable indicator of bilingual language development and proficiency in the first language (Bedore et al., 2012). To be designated ESs, students needed to be designated English proficient by the school district and report speaking English at home as the primary language.

Table 1 displays sample characteristics by language status. While ideally multiple data types would provide individual SES information, the only accessible indicator was whether students were receiving Free and Reduced Meal Subsidies (FARMS). Although DLL status is often correlated with lower SES, as high proportions of students overall (83.5%) and within the DLL (88.6%) and ES (77.6%) subgroups were receiving FARMs, we did not control for FARMS. Importantly, across language groups, students were largely from ethnic/racial minority backgrounds, with most (64.7%) reporting being Hispanic, including 95.1% of DLLs and 29.8% of ESs, or Black (28.3%), including 60.2% of ESs and 0.5% of DLLs.

Procedures

All cognitive measures were part of a larger battery of assessments administered individually in the fall and spring of Year 2 of the project. Research assistants completed two fidelity checks beforehand. Reading engagement was rated by teachers in fall and spring, and the motivation questionnaire was completed by students in large group settings in the spring; project staff read all items aloud. DLLs had sufficient knowledge of English to understand all task instructions, which were in English.

Measures

Word identification. Students completed the WJ-IV Letter-Word Identification subtest, which entails reading aloud from a 78 item-list of letters and real English words (Schrank et al., 2014). Testing ends when the student misses 6 consecutive items, or completes the last item. The score is the total number correct. The test has split-half reliability of .92-.94 for 9-11 year olds (McGrew et al., 2014). For the current sample, test-retest reliability was .80 from fall to spring, and internal consistency (Cronbach's alpha) was .95 in fall and .93 in spring.

Linguistic comprehension. Students completed the WJ-IV Picture Vocabulary and Oral Comprehension subtests (Schrank et al., 2014). The former requires students to name pictures of objects, while the latter entails listening to short passages and supplying the missing, final word, based on syntactic and semantic clues. The Vocabulary test includes 54 items, while the Oral Comprhension test has 33. These tests likewise end when a student misses 6 items in a row or reaches the last item. Split-half reliability for 9-11 year olds ranges from .80-.82 for Oral Comprehension and from .77-.78 for Picture Vocabulary. For the present sample, test-retest reliability was .71 for Oral Comprehension and .75 for Picture Vocabulary. Cronbach's alpha was .83 and .81 in the spring for Oral Comprehension and Picture Vocabulary, respectively, and .63 and .84 in the fall. A composite score was calculated by summing Picture Vocabulary and Oral Comprehension scores for total number correct. These subtest scores were strongly correlated (.69 in fall, .62 in spring).

Cognitive strategies. We were interested in measuring the use of cognitive strategies, as an oft-used and traditional marker of intentional, deliberate reading. That is, a strategic reader, who effectively deploys cognitive strategies, works towards the goal of comprehending text -- be it understanding a science text, appreciation of a poem or following manual instructions (Afflerbach, Pearson & Paris, 2008; Alexander, Graham, & Harris; 1998). We measured two cognitive strategies that are typically associated and predictive of reading comprehension performance: comprehension monitoring and inference making (e.g., Oakhill, 2012). In order to obtain a measure of cognitive strategy use, we needed to include both performance as it relates to monitoring comprehension while reading (checking for understanding) and making inferences that interconnect text or link text to information beyond the text. Performance on both of these strategy measures renders a fuller understanding of a student's ability to use cognitive strategies than performance on a single strategy. We therefore obtained measures on inference making and on comprehension monitoring and used them to obtain an equally weighted index of strategy use (called cognitive strategies). First, the Inference Making task, involved listening to two recorded stories, each comprised of three paragraphs and each followed by six questions requiring text-connecting inferences (which establish local coherence) and four requiring gap-filling or global inferences (which integrate text information with other knowledge). This task was adapted from existing measures (Language and Reading Research Consortium & Muijselaar, 2018; Oakhill & Cain, 2012). Partially correct answers received 1 point, while fully correct answers received 2 points, so the highest possible total score was 40 points. Internal consistency (Cronbach's alpha) with this sample was .70 in fall and .68 in spring.

Second, a Comprehension Monitoring measure, adapted from the inconsistency detection task originally developed by Cain and Oakhill (2007) and later refined by Ammi and Cain (2014), entailed listening to five 5-6 sentence stories, three of which were internally inconsistent such that two non-adjacent sentences had contradictory information (Oakhill, Hartt, & Samols, 2005). After each story, students had to determine stories that made or did not make sense based on the inconsistencies or lack of thereof. Two subscores were calculated for this task – number of stories which students correctly judged as making sense or not and the number of legitimate reasons (out of 6) given for why the inconsistent stories did not make sense; these subscores correlated .82-.84 at the two data collection points. Cronbach's alpha was .79 in fall and .72 in spring.

A composite score for cognitive strategies was constructed by summing the Inference Making and Comprehension Monitoring scores. Across fall and spring, the component scores correlated .28-.32, suggesting that performance on them was positively related but required distinct cognitive processes involved in being a strategic reader. Further, each component correlated moderately (r's = .33 to .49) with our reading comprehension outcome in the fall and spring.

Reading engagement. Teachers rated students using the Reading Engagement Index (REI) , which is considered a measure of behavioral engagement because ratings are based on students' overt manifestation of engaged reading (Guthrie et al., 2007). The REI includes eight items, each with a 4-point rating scale ranging from *not true* to *very true.* For example, items include "often reads independently" and "works hard in reading." The REI is scored by reverse coding one item ("is easily distracted in self-selected reading"), and then summing all item ratings. Cronbach's alpha was.92 in fall and .93 in spring.

Reading motivation. A revised version of the Motivations for Reading Questionnaire (MRQ) captured students' perspectives on their reading motivations (Wigfield & Guthrie, 1997; Wang & Guthrie, 2004). (For the questionnaire and further details on its development, see the Electronic Supplementary Information.) In brief, the updated MRQ was designed to be appropriate for both ESs and DLLs in the Grades 2-5, whereas older versions were geared more toward ESs in Grade 4 and above. Additionally, it focused on just 5 of the 11 dimensions of reading motivation previously identified (Wigfield & Guthrie, 1997). This enabled it to be administered in 15-20 minutes and not overwhelm the youngest students.

The MRQ includes 30 items total. The dimensions are self-efficacy (7 items, e.g., "I am a good reader."), two intrinsic motivations – involvement (7 items, e.g., "I really enjoy a long story.") and curiosity (5 items, e.g., "I read to learn new things.") – and two extrinsic motivations – competition (6 items, e.g., "I want to be the best at reading in my class.") and recognition (5 items, e.g., "I love it when others say nice things about my reading."). The response scale included 4 points: Students were instructed to pick *YES!!* if the item was a lot like them, *yes* if it was a little like them, *no* if it was a little different from them, and *NO!!* if it was very different from them (Hamilton, Nolen, & Abbott, 2013).

A composite score for internal motivation was created by averaging scores for the involvement, curiosity, and self-efficacy items, and one for extrinsic motivation by averaging scores for the competition and recognition items. Combining self-efficacy with involvement and curiosity aligns with the composition of the REI in this and past studies (e.g., Guthrie et al., 2007; Taboada, Tonks, Wigfield, & Guthrie, 2009; Taboada, Townsend, & Boynton, 2013). It also meshes with the motivation scale used in a study of fifth- to eighth-graders (Froiland & Oros, 2013). Additionally, based on factor analysis (principal axis factoring with direct oblimin rotation), a 2-factor model reflecting these two composites emerged as the most appropriate factor solution. Cronbach's alphas for the internal and extrinsic composites were .85 and .83, respectively.

Reading comprehension. Students were given the Passage Comprehension subtest of the Woodcock Johnson-IV Tests of Achievement (WJ-IV; Schrank, Mather, & McGrew, 2014). Most of the 52 items comprising this subtest entail silently reading 1-2 sentence passages and providing a missing word, while a few require matching pictures to words or picture symbols. Testing ends when the student misses 6 consecutive items, or reaches the last item. The score is the total number correct. This test has split-half reliability of.81-.89 for 9-11 year olds (McGrew, LaForte, & Schrank, 2014). For the current sample, test-retest reliability was .69 and Cronbach's alpha for the current sample was .84 in the fall and .86 in the spring.

Statistical Analyses

First, cases were removed if they were missing either all fall or all spring data, or, otherwise, scores on more than half the assessment variables. Independent sample t-tests demonstrated that the 37 excluded students did not differ from the included sample in performance on the analysis variables during the previous year of the project, in either fall or spring of that year, with $p \geq .05$ for all tests. Multiple imputation with iterative Markov Chain Monte Carlo estimation was employed to create five complete data sets; reported results are derived from pooling the values obtained for each set of five analyses, per rules suggested by Rubin (1996). Auxiliary variables in the multiple imputation models included all assessment variables from the present study, and data from these assessments administered in fall and spring of the prior year, scores on an executive function battery administered twice each in the current and prior school year, and demographic data.

The nesting of students within classrooms was accommodated by using the Complex Samples function in IBM SPSS Statistics (Version 25; IBM, 2017) to obtain linearized standard error estimates based on the cluster (classroom) dependency. T-tests were a function of 34 degrees of freedom, as there were 35 classrooms. Within Complex Samples, analyses for all questions were conducted within the General Linear Model. All analysis variables were standardized with a mean of 0 and standard deviation of 1. Effective power for the analyses ranged from .84 to >.99 for detecting small- to medium-sized effects (f^2 = .02-.15) at an alpha level of .05 (two-tailed) (Cohen, 1988). This was calculated using G*Power Version 3.1.9.2 (Faul, Erdfelder, Buchner, & Lang, 2009).

More specifically, for Question 1, which concerned differences in performance levels in the fall, we conducted a series of one-way ANOVAs with language status (EL or ES) as the factor, and the five fall assessment variables as dependent variables; we focused on fall variables in order to determine whether there were baseline differences that might offer insight into any differential predictability of reading comprehension in the two subgroups. Signficance of the results was judged using the Benjamini-Hochberg corrected alpha level of $p \leq .03$ (Benjamini & Hochberg, 1995). This procedure, which controls the false discovery rate, is considered more appropriate for controlling against Type 1 error than the more conservative, traditionally employed Bonferroni correction for familywise error rates (Benjamini & Hochberg, 1995; Thissen, Steinberg, & Kuang, 2002).

For Questions 2a-c, which concerned the relations of reading comprehension with the other key study variables concurrently and over time, and whether these relations were moderated by language status, we employed multiple hierarchical regression analyses following Frazier, Tix, and Barron's (2004) procedure for analyses involving moderator variables. Language status (LS) was dummy coded, such that 0 = ES, 1 = DLL, and, to assess its potential moderating effect, in each analysis, LS was multiplied by each of the continuous variables to create interaction terms that were entered in the final model for each analysis. When interactions were non-significant, the model preceding the addition of the interaction terms provides the focal results, and the tables depicting the results do not include the interaction terms (Aiken & West, 1991). The specific models examined to address each research question are described within the Results.

Question 2b also involved testing whether engagement mediated the relations of reading comprehension with the other focal variables. The assessment of mediation included four steps examining whether (1) the predictor and outcome variables are related; (2) the predictor and mediator are related; (3) the mediator and outcome variables are related when controlling for the predictor; and (4) the addition of the mediator significantly reduces the relationship of the predictor and the outcome (Barron & Kenny, 1986). Additionally, tests of the indirect effects were conducted using the confidence limits of the product approach and the estimated standard errors based on the multiple imputation procedure, given that indirect effect estimates cannot be assumed to be normally distributed (MacKinnon, Lockwood, & Williams, 2004); we used the application provided at https://amplab.shinyapps.io/MEDCI/ (Tofighi & MacKinnon, 2011).

Results

Data Pre-Processing

Examination of the data set for missingness, given the rules discussed prior, resulted in removing 37 cases, leaving 354 cases for analysis. The amount of missing data per variable for these 354 cases ranged from 11.3% (for spring extrinsic motivation) to 19.8% (for fall reading engagement), with a 14.8% average. The intraclass correlations (ICCs) for the outcome variables, fall and spring reading comprehension, were .10 and .11, respectively, and thus, as noted above, the dependency of students within classrooms was accommodated by obtaining adjusted standard errors.

For the language subgroups, means, adjusted standard errors, and bivariate correlations are displayed in Table 2; those for the full sample are contained in Electronic Supplementary Information.

Performance Levels in the Fall

Question 1 asked whether DLLs and ESs differed in their levels of reading comprehension, word identification, linguistic comprehension, cognitive strategies, and reading engagement in the fall. Pooling results for the five imputed data sets, ESs were significantly higher than DLLs in fall reading comprehension, $t(45.22) = 5.47$, $p \leq .001$, word identification, $t(67.56) = 3.63$, $p \leq .001$, and linguistic comprehension, $t(110.78) = 5.96$, $p \leq .001$; DLLs and ESs did not differ, however, in cognitive strategies, $t(242.46) = 1.92$, $p > .05$, or reading engagement, $t(38.93) = .83$, $p > .05$.

Prediction of Concurrent Reading Comprehension

Question 2a asked whether the focal language, cognitive, and engagement variables related uniquely to concurrent reading comprehension, for both DLLs and ESs. We conducted two sets of analyses to address this question. First, as shown in Table 3, we compared a series of models that employed fall reading comprehension as the dependent variable. In Model 1, language status was the sole predictor. Model 2 included language status plus fall word identification, linguistic comprehension, and cognitive strategies. Model 3 added reading engagement, and Model 4 added the interactions of language status with each of the four continuous variables previously entered. Second, as shown in Table 4, we conducted a partial replication of this analysis, using spring data. That is, the analysis with spring data was the same as for fall except that it in included internal and extrinsic motivation in Model 3, with reading engagement added in Model 4. Model 5 therefore added six interaction terms, derived from the multiplication of language status with each of the six continuous variables previously entered.

The results for fall and spring were consistent in indicating that, in order of decreasing magnitude, linguistic comprehension, word identification, and reading engagement, were each significant, unique positive predictors of concurrent reading comprehension for both DLLs and ESs. For the fall, this is based on the results for Model 3, and for the spring, on the results for Model 4, given that none of the interaction terms were significant, thus providing support for a unified model for DLLs and ESs. (The fall/spring *p* values associated with each interaction term were .37/.14 for LS x word identification, .21/.38 for LS x linguistic comprehension, .27/.12 for LS x cognitive strategies, .99/.43 for LS x reading engagement, na/.50 for LS x internal motivation, and na/.63 for LS x extrinsic motivation.) Thus, the interaction terms were removed from the analysis. Together, all variables, excluding the interaction terms, accounted for, on average, 67% and 70% of the variance in fall and spring reading comprehension, respectively, across the five imputations.

Reading Engagement as a Mediator

Question 2b concerned engagement as a possible mediator of the relations of the language, general cognitive, and motivation variables with reading comprehension for DLLs and ESs, as depicted in Figure 1. Spring data were employed to address this question, as it included the motivation variables.

Four of the six predictor variables considered dropped out of the analysis either because they did not satisfy Step 1 (predictor and outcome variables related) or satisfied Step 1 but not Step 2 (predictor variables related to mediator). The two predictors that did not satisfy Step 1 (i.e., that did not relate to reading comprehension) were language status and cognitive strategies (see Table 4, Model 3). The two predictors that satisfied Step 1 but not Step 2 (i.e., that did not relate to engagement) were linguistic comprehension, $\beta = -.12$ (SE = .08) and extrinsic motivation, $\beta = .02$ (SE = .06), $p > .05$ for both.

For the two remaining variables – word identification and internal motivation – reading engagement indeed appeared to be a mediator of their relations with reading comprehension based on the four-step method. That is, as shown in Table 4, Model 3, word identification and internal motivation significantly related to reading comprehension, satisfying Step 1. Meeting Step 2, a separate regression analysis showed that word identification, $\beta = .38$ (SE = .07), $p \leq .001$, and internal motivation, $\beta = .20$ (SE = .07), $p \leq .01$, significantly predicted reading engagement. Meeting Step 3, reading engagement significantly predicted reading comprehension, controlling for each other predictor of interest and language status (see Table 4, Model 4). Regarding Step 4, we found mixed evidence. The betas for word identification and internal motivation indeed declined from Models 3 to 4, by .05 and .02, respectively, with that for the former remaining significant and that for the latter becoming non-significant (see Table 4). Further, the indirect effects of word identification and internal motivation on reading comprehension were statistically significantly different from zero as determined using the confidence limits of the product approach. This would support the idea that reading engagement partially mediated the effect of word identification and fully mediated the effect of internal motivation on reading comprehension. However, with the beta for internal motivation only changing from the significant value of .08 to the non-significant value of .06, this does not appear to be a practically meaningful result.

Prediction of Reading Comprehension Growth

Question 2c asked whether the focal language, cognitive, and engagement variables related uniquely to reading comprehension growth in DLLs and ESs. Results are displayed in Table 5. The multiple regression conducted to address this question used spring reading comprehension as the dependent variable and fall reading comprehension as an autoregressor in all models. Including the autoregressor allows the inference that any predictors later entered that show significance are associated with changes in reading comprehension (Gollob & Reichardt, 1987).

Model 1 included the autoregressor and the dummy-coded language status variable. Then, two versions of Model 2 were run: In Version 1, Model 2 included the auto-regressor, language status, and reading engagement, whereas in Version 2, Model 2 included the autoregressor, language status, and the cognitive variables (word identification, linguistic comprehension, and cognitive strategies). Model 3 included the autoregressor, language status, reading engagement, and the three cognitive variables. Model 4 added five interaction terms to the variables in Model 3 – the product of language status with the autoregressor, reading engagement, and each of the three cognitive variables previously entered.

In Version 1-Model 2, fall reading engagement significantly predicted spring reading comprehension, controlling for fall reading comprehension and language status; reading engagement added 2% to the variance in the outcome variable accounted for by the Model 1 variables alone. Similarly, in Version 2-Model 2, each of the three fall cognitive variables significantly predicted spring reading comprehension, altogether adding 12% to the variance predicted in spring reading comprehension. When the three cognitive variables and reading engagement were examined together (Model 3), however, only the cognitive variables were significant predictors. None of the interactions terms were significant, indicating that these relations between the predictors and comprehension growth were the same for DLLs and ESs. (The interaction term *p* values were as follows: .81 for LS x reading comprehension auto-regressor, .38 for LS x reading engagement, .63 for LS x word identification, .83 for LS x linguistic comprehension, and .96 for LS x cognitive strategies.)

Discussion

Overview

This study explored whether a unified model of reading comprehension is appropriate for DLLs and ESs, or whether distinctive models of reading comprehension are needed for these language subgroups in the upper elementary years. In addition to well-established predictors of reading comprehension across language groups (word identification and linguistic comprehension), the focal variables in this study included cognitive strategies, engagement, and motivation. These latter three variables are known predictors of reading comprehension for ESs, but understudied in DLLs. Contrary to our hypotheses, we found that for both the concurrent prediction of reading comprehension and the prediction of reading comprehension growth, there were no differences across language groups in the magnitude or directionality of relations. That is, the cognitive processes of word identification, linguistic comprehension, and cognitive strategies as well as the engagement, and motivational processes appeared essentially identical across language groups in their prediction of reading comprehension both concurrently and across the school year, supporting a unified model of reading comprehension, at least for the present subgroups. Importantly, the current subgroups differed in language background, but were similarly comprised largely of minority students from lower SES backgrounds. Further, it is plausible that differences in the relations across language groups did not appear because this study focused on a subset of DLLs who were in the middle to later stages of developing language proficiency, rather than beginning stages. That is, we selected students at WIDA proficiency levels of 3-5 (out of 6 levels, with the 6^{th} level indicating equivalence to native ESs), and, overall, the DLL group had an average WIDA score of 3.98.

The effects of the word identification and linguistic comprehension skills were more pronounced than those for cognitive strategies, engagement, and motivation. This lends support to continued emphasis on the former in comprehension instruction, especially for Spanish-speaking DLLs. The findings regarding cognitive strategies, engagement, and motivation raise some questions about their importance for DLLs' reading comprehension performance. Given the limited body of research on the role of these variables in DLLs' reading achievement, yet the extensive research indicating their importance in literacy development with other populations, future research with refined measures and designs is warranted, as detailed in the Limitations and Future Research Directions section.

Roles of Word Identification, Linguistic Comprehension, Cognitive Strategies, Engagement, and Motivation in Reading Comprehension

Differences in performance on key variables: Convergent evidence and new directions. Our first set of findings indicated that ESs performed better than DLLs on word identification, linguistic comprehension, and reading comprehension. This trend is consistent with past findings regarding DLLs, especially Spanish-speaking DLLs who struggle with reading (Lesaux & Kieffer, 2010; Mancilla-Martinez & Lesaux, 2010; Proctor et al., 2014). It also aligns with findings that although up to Grade 3 DLLs tend to be on par with their ES counterparts on word decoding, they tend to fall behind on comprehension processes markedly starting at that grade (Mancilla- Martinez & Lesaux, 2010; Nakamoto et al., 2007; Proctor et al., 2005).

In contrast, ESs and DLLs did not differ in their cognitive strategy performance or reading engagement levels. DLLs' equal reading engagement scores despite their lower performance on most cognitive measures suggests that reading engagement may not be influenced by English proficiency status; that is, DLLs and ESs may tend to display similar degrees of engagement in their reading. The extent to which this equivalence in reading engagement appears may be related to whether students are given and choose to read materials appropriate for their abilities and interests (Guthrie & Klauda, 2016). It is also an encouraging finding as it suggests teachers, who completed the engagement measure, were not negatively affected by their awareness of the DLLs' lower reading performance when reporting their perceptions of these students' engagement.

The similarity in cognitive strategies across language groups may be a product of strategy instruction being part of the weekly comprehension instruction routine in the focal schools, starting in Grade 2. In other words, across language groups, students had similar exposure to strategy instruction, and thus may have performed similarly on our strategy measures. Given, however, that both the DLLs and ESs showed low reading achievement overall – their spring performance on the reading comprehension measure translated to grade equivalents of 2.7 and 3.3 – much maturation and practice in strategy use is likely still needed for these students. Indeed, the cognition literature indicates that with increased use, strategies become more automatic, requiring less conscious attention and reflection, and making strategy users more flexible and versed in their use (Pressley & Harris, 2006). The strategies assessed in this study, inference making and comprehension monitoring, especially require considerable metacognitive ability, as the former requires integrating information from different sections of a text, and the latter requires evaluating one's state of understanding of information (e.g., Cain & Oakhill, 1999;

Oakhill, Hartt & Samols, 2005). Metacognition, which involves the regulation of thinking and application of deliberate, procedural knowledge, also has a long developmental timeline (e.g., Flavell, 1979). Thus, future studies that examine strategy performance in the current and higher grades are needed to understand if and when any differences in strategy use between DLLs and ESs develop.

Predicting reading comprehension: Towards a unified model. Our second set of findings revealed that both cognitive and engagement variables predicted concurrent reading comprehension performance in both language groups. They predicted reading comprehension growth over the school year as well, though engagement did not do so beyond the cognitive variables. These findings lend support to the unified model of reading comprehension. Specifically, the well-established, cognitive predictors of word identification and linguistic comprehension predicted reading comprehension performance concurrently in the fall and spring, as well as predicted growth across the school year, beyond the effects of cognitive strategies and reading engagement. Cognitive strategies did not predict concurrent reading comprehension performance, but did predict growth in reading comprehension from fall to spring, over and above the variance accounted for by the two predictors comprising the simple view of reading, word identification and linguistic comprehension (SVR; Gough & Tunmer, 1986; Hoover & Gough, 1990). This suggests that the effects of better strategy use may not be immediately apparent but may play out over time. Further, the predictive power of cognitive strategies aligns with findings that the relative contribution of SVR constructs – which account for a large portion of the variance in reading comprehension across the early elementary school years (e.g., Kendeou, van den Broek, White & Lynch, 2009; Lonigan, Burgess, & Schatschneider, 2018) – might vary as a function of reading comprehension development, such that variability in other, higher-order cognitive processes comes to account more for variance in reading comprehension (e.g., (Catts, 2018; Kendeou, van den Broek, Helder, & Karlsson, 2014; Loningan et al., 2018). This may happen especially after Grade 3 as students approach mastery on decoding (Freebody & Anderson, 1983; Snow, 2018). If anything, the predictive value of cognitive strategies for reading comprehension growth of DLLs and ESs alike supports the importance of continuing instruction in higher-order strategies as part of the panoply of effective reading comprehension instruction for all children.

Our findings regarding reading engagement – and motivation – also lend support to the unified view, but additionally raise questions about the role that reading engagement and motivation play in comprehending text. In this set of findings, reading engagement emerged in the fall as a significant predictor of concurrent reading comprehension over and above the effects of all three cognitive and language predictors (word identification, linguistic comprehension, and cognitive strategies). In the spring, reading engagement again did so over and above the effects of these same variables, plus internal and extrinsic motivation, which were significant positive and negative predictors, respectively, only before engagement was added to the model. The practical significance of these findings is questionable, however, given that engagement added only 1% to the variance explained in fall reading comprehension; engagement and motivation together added 2% in the spring. Likewise, reading engagement also predicted reading comprehension growth when examined as a predictor beyond the auto-regressor and language status, but added only 2% to the variance accounted for. The small magnitude of these effects is consistent with other samples comprised of primarily lower achieving ESs (e.g., Klauda & Guthrie, 2015; Saarnio, Oka, & Paris, 1990) and of DLLs or ethnic minority populations (Proctor et al., 2014; Unrau & Schlackman, 2006).

The limited relations of reading engagement and motivation with reading comprehension in this study and past research may be related to the use of self-report measures like the MRQ, which was developed using samples that were mixed in ethnicity and socioeconomic status but largely comprised of native English speakers (Wigfield & Guthrie, 1997); the studies cited in this paragraph all specifically employed the MRQ, except that by Saarnio and his colleagues (1990). In the present study, we modified the MRQ substantially, revising the items considerably for clarity and simplicity to make them more accessible to DLLs within a broad range of English proficiency, and, generally, to make the measure suitable for children reading at a second grade level. Notably, this revised MRQ showed high reliability across language groups: for internal motivation, Cronbach's alpha was .84 for DLLs and .85 for ESs, and for extrinsic motivation, it was 83 for DLLs and .84 for ESs. However, the limited role of motivation in predicting reading comprehension in this study suggests that perhaps the revised MRQ is not capturing motivation in a way that is as applicable to DLLs' and/or low-achieving ESs' reading comprehension, either due to the scope of motivation constructs assessed or in how the current constructs are operationalized.

It is also plausible that both the DLLs' and ESs' relatively low reading comprehension levels in the present study were not at a necessary threshold for motivation to bear substantial effects on their performance. In other words, our second hypothesis – which referred to potential limits on the power of motivational processes to influence reading comprehension for DLLs because of their limited linguistic proficiency – might be reformulated to say that limited English linguistic proficiency, reading ability, or both, may be inhibiting factors. Accordingly, it is notable that (a) the zero-order correlations between reading engagement and the cognitive measures appeared to be systematically lower for DLLs than ESs in the fall (only) and (b) DLLs' reading performance (word identification and reading comprehension) improved from the fall to spring, such that by the spring they were close to the level the ESs had been at in the fall (see Table 2). This trend raises a potential contradiction to the unified model, but also provides support for the idea that increasing reading ability may enable reading engagement and motivation to bear on the performance of reading and related cognitive skills. Had both the DLLs and ESs been at higher levels of reading achievement in the present study, reading engagement and motivation may have been found to play more prominent roles in the examined models.

Reading engagement as a partial explanatory mechanism. This study explored the potential role of reading engagement as a mediator of the relations of the motivation and cognitive variables with reading comprehension. Whereas moderators address "when" or "for whom" a predictor is more strongly related to an outcome variable, a mediator is defined as a mechanism, or a variable that explains the "how" and "why" of the relation between a predictor and an outcome (Baron & Kenny, 1986; Frazier et al., 2004). Here we centered on reading engagement as a possible explanatory mechanism through which cognitive and motivation variables influenced reading comprehension, because of its potential to be augmented through instruction and its hypothesized mediator role within theoretical explanations of reading processes (e.g., Guthrie & Klauda, 2016). Congruent with prior views that behavioral engagement consists of active participation in an activity, we believe that stronger cognitive skills enable and internal motivation energizes involved and effortful reading, which in turn enhances reading comprehension; these linkages may work in both the particular, immediate context and in varied, distal contexts as the knowledge and reading skills accrued through regular engaged reading benefit one's general capacity for reading comprehension. Indeed, our findings provide evidence that reading engagement partially mediated the relations of word recognition with reading comprehension. Additionally, mediation of the effect of internal motivation by reading engagement was statistically supported, though it did not appear to be of practical significance (as the beta for internal motivation decreased minimally). One reason for this may be that in the current relatively low-achieving sample, the relations of motivation with reading comprehension, while significant even controlling for the cognitive predictors, were more limited than they would be in a sample with a broader achievement spectrum – in which higher-achieving students would be likely to show greater internal motivation , consistent with past research (e.g., Baker & Wigfield, 1999; Wang & Guthrie, 2004 – and thus limited the potential for mediation of these relations by reading engagement.

Limitations and Future Research Directions

As does any empirical study, our study has limitations. Here we address at least four of them. First, we focused on Spanish-speaking DLLs, leaving us unaware of how similar analyses may play out with other DLLs, such as those with Asian language backgrounds, including relatively recent immigrant groups such as Hmong students. Based on empirical work comparing relations of reading motivation and achievement for Hispanic and Asian-American students (Unrau & Schlackman, 2006), we suspect, for instance, that intrinsic motivation and engagement might play more prominent roles in reading comprehension for Asian DLLs. As Unrau and Schlackman extensively discussed, cultural values and voluntary versus involuntary immigration status may influence students' motivation and its' impact on achievement. Comparing how cognitive factors, engagement, and motivation relate to reading comprehension across students with different language/cultural backgrounds is a valuable avenue for future research.

Second, because we did not assess degree of bilingualism (except for self-reported usage of the first language at home) we are unaware how the cognitive and cultural benefits derived from it could affect the interplay of the cognitive, engagement, and motivation processes contributing to reading comprehension (e.g., Bialystok, 2003). The benefits of full or balanced bilingualism found in the cognitive arena could facilitate gains in motivation and engagement, or to specific dimensions of motivation such as self-efficacy for reading in the first and/or second language (see Bialystok, 2003 for a full review of bilingualism's benefits). Third, we are unaware of biliteracy levels in our DLL sample; thus, we can only speak to the impact of engagement on reading in their school (English) language and are left to wonder about its potential impact on Spanish literacy, and, in turn, the implications for English reading. Lastly, the current conclusions can only generalize to upper elementary students without learning disabilities. We suspect they may be different for emerging readers in grades K-2 given the differential patterns of reading and motivation between the early and later elementary grades, as well as for students with learning disabilities.

Given the limited role of reading engagement and motivation found presently, one important step for future research is to consider other dimensions and methods of measuring engagement, as well as other sub-constructs within the dimensions of internal and extrinsic motivation, such as recently identified in qualitative work with DLLs and their teachers. Specifically, another possible extrinsic dimension is reading for the sake of *fitting in* with English-speaking peers, for instance, by choosing books that their peers are reading or reading to learn about American culture (Protacio & Jang, 2016). Future studies might also explore how DLLs' reading engagement, motivation, and comprehension in English compare with that in their native language, and examine negative emotions such as high anxiety, to explore how these emotions might interact with cognitive variables in explaining reading achievement in each language. Additionally, a mixed methodological approach that examines both DLLs' – and ESs –

generalized reading engagement and their situated reading engagement in specific classroom contexts may help develop insight into factors contributing to their reading comprehension, and the extent to which instructional features facilitate reading comprehension similarly across language groups. Altogether, such work would potentially add evidence, but also nuances, to the contention, supported in the present study that DLLs and ESs – similar in demographic characteristics besides language background – are more alike than different in how cognitive, engagement, and motivation processes affect their reading comprehension.

References

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions.* Newbury Park, CA: Sage.

Afflerbach, P., Pearson, P. D., & Paris, S. G. (2008). Clarifying differences between reading skills and reading strategies. *The Reading Teacher, 61,* 364-373. doi:10.1598/RT.61.5.1

Alexander, P. A., Graham, S., & Harris, K. R. (1998). A perspective on strategy research: Progress and prospects. *Educational Psychology Review, 10,* 129-154. doi: 10.1023/A:1022185502996

Ammi, S., & Cain, K. (2014, August). *Children's comprehension monitoring of inconsistencies in text: a reading time and eye-tracking study*. Paper presented at the annual meeting of the Society for Text and Discourse, Chicago, IL.

Baker, L., & Brown, A. L. (1984). Metacognitive skills and reading. In D. P. Pearson, M. Kamil, R. Barr, & P. Mosenthal, (Eds.), *Handbook of reading research* (pp. 353-394). New York, NY: Longman.

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,* 452-477. doi: 10.1598/RRQ.34.4.4

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51,* 1173-1182. doi: 10.1037/0022-3514.51.6.1173

Bedore, L. M., Peña, E. D., Summers, C. L., Boerger, K. M., Resendiz, M. D., Greene, K.,…

Gillam, R. B. (2012). The measure matters: Language dominance profiles across measures in Spanish-English bilingual children. *Bilingualism: Language and Cognition, 15*, 616-629. doi:10.1017/S1366728912000090

Benjamini, Y., & Hochberg, Y. (1995). Controlling the false discovery rate: a practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society: Series B*, *57,* 289-300. Retrieved from https://www.jstor.org/stable/2346101?seq=1#page_scan_tab_contents

Borkowski, J. G., Chan, L. K. S., & Muthukrishna, N. (2000). A process-oriented model of metacognition: Links between motivation and executive functioning. In G. Schraw & J. C. Impara (Eds.), *Issues in the measurement of metacognition* (pp. 1–41). Lincoln, NE: Buros Institute of Mental Measurements, University of Nebraska-Lincoln.

Brady, S. A., & Shankweiler, D. P. (1991). *Phonological processes in literacy: A tribute to Isabelle Y. Liberman* (pp. 129-151). Hillsdale, NJ: Lawrence Erlbaum.

Cain, K., & Oakhill, J. V. (1999). Inference making ability and its relation to comprehension failure in young children. *Reading and Writing: An Interdisciplinary Journal*, *11,* 489-503. doi: 10.1023/A:1008084120205

Cain, K., & Oakhill, J. (2007). Reading comprehension difficulties: Correlates, causes, and consequences. In K. Cain & J. Oakhill (Eds.), *Children's comprehension problems in oral and written language: A cognitive perspective* (pp. 41-75). New York, NY: Guilford.

Cain, K., & Oakhill, J. (2014). Reading comprehension and vocabulary: Is vocabulary more important for some aspects of comprehension? *L'Anée Psychologique [Psychological Year]/Topics in Cognitive Psychology, 11,* 647-662. doi: 10.4074/S0003503314004035

Carlisle, J. F., Beeman, M. M., Davis, L. H., & Spharim, G. (1999). Relationship of metalinguistic capabilities and reading achievement for children who are becoming bilingual. *Applied Psycholinguistics, 20,* 459-478. doi: 10.1017/s0142716499004014

Carlo, M. S., August, D., McLaughlin, B., Snow, C. E., Dressler, C., Lippman, D. N.,…White, C. E. (2004). Closing the gap: Addressing the vocabulary needs of English language learners in bilingual and mainstream classrooms. *Reading Research Quarterly, 39,* 188-206. doi: 10.1177/0022057409189001-205

Catts, H. W. (2018). The simple view of reading: Advancements and false impressions. *Remedial and Special Education, 39,* 317-323. doi: 10.1177/0741932518767563

Catts, H. W., Adlof, S. M., & Weismer, S. E. (2006). Language deficits in poor comprehenders: A case for the Simple View of Reading. *Journal of Speech, Language, and Hearing, 49,* 278-293. doi: 10.1044/1092-4388(2006/023)

Cho, E., Capin, P., Roberts, G., Roberts, G. J., & Vaughn, S. (2019). Examining sources and mechanisms of reading comprehension difficulties: Comparing English learners and non-English learners within the simple view of reading. *Journal of Educational Psychology, 111*, 982-1000. doi:10.1037/edu0000332

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.

Farnia, F., & Geva, E. (2013). Growth and predictors of change in English language learners' reading comprehension. *Journal of Research in Reading, 36,* 389-421. doi: 10.1111/jrir.12003

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41,* 1149-1160. doi: 10.3758/brm.41.4.1149

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist, 34,* 906-911. doi: 10.1037/0003-066X.34.10.906

Frazier, P. A., Tix, A. P., & Barron, K. E. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of Counseling Psychology***,** *51,* 115-134. doi: 10.1037/0022-0167.51.1.115

Fredricks, J., A., Blumenfeld, P. B., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74,* 59-109. doi: 10.3102/00346543074001059

Freebody, P., & Anderson, R. C. (1983). Effects of vocabulary difficulty, text cohesion, and schema availability on reading comprehension. *Reading Research Quarterly, 18,* 277-294. doi: 10.2307/747389

Froiland, J. M., & Oros, E. (2014). Intrinsic motivation, perceived competence and classroom engagement as longitudinal predictors of adolescent reading achievement. *Educational Psychology: An International Journal of Experimental Educational Psychology, 34,* 119-132. doi: 10.1080/01443410.2013.822964

Geva, E., & Farnia, F. (2012). Developmental changes in the nature of language proficiency and reading fluency paint a more complex view of reading comprehension in ELL and EL1. *Reading and Writing: An Interdisciplinary Journal, 25,* 1819-1845. doi: 10.1007/s11145-011-9333-8

Gollob, H. F., & Reichardt, C. S. (1987). Taking account of time lags in causal models. *Child Development, 58,* 80–92. doi: 10.2307/1130293

Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading, and reading disability. *Remedial and*

Special Education, *7,* 6-10. doi: 10.1177/074193258600700104

Guthrie, J. T., Hoa, A. L. W., Wigfield, A., Tonks, S. M., Humenick, N. M., & Littles, E. (2007). Reading motivation and reading comprehension growth in the later elementary years. *Contemporary Educational Psychology, 32,* 282-313. doi: 10.1016/j.cedpsych.2006.05.004

Guthrie, J. T., & Klauda, S. L. (2016). Engagement and motivational processes in reading. In P. Afflerbach (Ed.), *Handbook of individual differences in reading: Reader, text, and context* (pp. 41-53). New York, NY: Routledge.

Guthrie, J. T., Klauda, S. L., & Ho, A. (2013). Modeling the relationships among reading instruction, motivation, engagement, and achievement for adolescents. *Reading Research Quarterly, 48,* 9-26. doi: 10.1002/rrq.035

Guthrie, J. T., & Wigfield, A. (2000). Engagement and motivation in reading. In M. Kamil & P. Mosenthal (Eds.), *Handbook of reading research* (Vol. 3, pp. 403-422). Mahwah, NJ: Erlbaum.

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,* 231-257. doi: 10.1207/s1532799xssr0303_3

Hamilton, E. W., Nolen, S. B., & Abbott, R. D. (2013). Developing measures of motivational orientation to read and write: A longitudinal study. *Learning and Individual Differences: Journal of Psychology and Education, 28,* 151-166. doi: 10.1016/j.lindif.2013.04.007

Hoover, W. A., & Gough, P. B. (1990). The simple view of reading. *Reading and Writing: An Interdisciplinary Journal, 2,* 127-160. doi: 10.1007/bf00401799

IBM Corp. (2017). IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.

Kendeou P., Van den Broek P., Helder A. & Karlsson J. (2014). A cognitive view of reading comprehension: Implications for reading difficulties. *Learning Disabilities Research and Practice, 29,* 10-16. doi: 10.1111/ldrp.12025

Kendeou, P., van den Broek, P., White, M. J., & Lynch, J. S. (2009). Predicting reading comprehension in early elementary school: The independent contributions of oral language and decoding skills. *Journal of Educational Psychology, 101,* 765-778. doi:10.1037/a0015956

Kieffer, M. J. (2008). Catching up or falling behind? Initial English proficiency, concentrated poverty, and the reading growth of language minority learners in the United States. *Journal of Educational Psychology, 100,* 851-868. doi: 10.1037/0022-0663.100.4.851

Kieffer, M. J., & Vukovic, R. K. (2012). Components and context: Exploring sources of reading difficulties for language minority learners and native English speakers in urban schools. *Journal of Learning Disabilities, 45,* 433-452. doi: 10.1177/0022219411432683

Kim, Y. G. (2017). Why the Simple View of reading is not so simplistic: Unpacking component skills of reading using a Direct and Indirect Effect Model of Reading (DIER). *Scientific Studies of Reading, 21,* 310-333. doi: 10.1080/10888438.2017.1291643

Kintsch, W., & Kintsch, E. (2005). Comprehension. In S. G. Paris & S. A. Stahl (Eds.), Children's reading comprehension and assessment (pp. 71–92). Mahwah, NJ: Erlbaum.

Klauda, S. L., & Guthrie, J. T. (2015). Comparing relations of reading motivation, engagement, and achievement among struggling and advanced adolescent readers. *Reading and Writing: An Interdisciplinary Journal, 28*, 239-269. doi: 10.1007/s11145-014-9523-2

Kush, J. C., Watkins, M. W., & Brookhart, S. M. (2005) The temporal-interactive influence of reading achievement and reading attitude. *Educational Research and Evaluation: An*

International Journal on Theory and Practice, 11, 29-44. doi: 10.1080/13803610500110141

Language and Reading Research Consortium, & Muijselaar, M. M. L. (2018). The dimensionality of inference making: Are local and global inferences distinguishable? *Scientific Studies of Reading, 22,* 117-136. doi: 10.1080/10888438.2017.1371179

Lesaux, N. K., & Kieffer, M. J. (2010). Exploring sources of reading comprehension difficulties among language minority learners and their classmates in adolescence. *American Educational Research Journal, 47,* 596-632.

Lesaux, N. K., Rupp, A. A., & Siegel, L. S. (2007). Growth in reading skills of children from diverse linguistic backgrounds: findings from a 5-year longitudinal study. *Journal of Educational Psychology, 99,* 821-834. doi: 10.1037/0022-0663.99.4.821

Lonigan, C. J., Burgess, S. R., & Schatschneider, C. (2018). Examining the simple view of reading with elementary school children: Still simple after all these years. *Remedial and Special Education, 39,* 260-273. doi: 10.1177/0741932518764833.

Lutz, S. L., Guthrie, J. T., & Davis, M. (2006). Scaffolding for engagement in elementary school reading instruction. *Journal of Educational Research*, *100*, 3-20. doi: 10.3200/JOER.100.1.3-20

MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research, 39,* 99-128. doi: 10.1207/s15327906mbr3901_4

Mancilla-Martinez, J., & Lesaux, N. K. (2010). Predictors of reading comprehension for struggling readers: The case of Spanish-speaking language minority learners. *Journal of Educational Psychology*, *102,* 701-711. doi: 10.1037/a0019135

McGrew, K. S., LaForte, E. M., & Schrank, F. A. (2014). *Woodcock Johnson IV technical manual.* Rolling Meadows, IL: Riverside.

Mol, S., & Bus, A. (2011). To read or not to read: A meta-analysis of print exposure from infancy to early adulthood. *Psychological Bulletin*, *137,* 267-296. doi: 10.1037/a0021890

Nakamoto, J., Lindsey, K. A., & Manis, F. R. (2007). A longitudinal analysis of English language learners' word decoding and reading comprehension. *Reading and Writing: An Interdisciplinary Journal, 20,* 691-719. doi: 10.1007/s11145-006-9045-7

National Center for Education Statistics. (2014). *Status and trends in the education of racial and ethnic minorities.* Retrieved from http://nces.ed.gov/pubs2010/2010015/tables/table_8_2a.asp.

National Reading Panel. (2000). *Report of the National Reading Panel: Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups*. Retrieved from https://www.nichd.nih.gov/publications/pubs/nrp/Pages/smallbook.aspx

Netten, A., Droop, M., & Verhoeven, L. (2011). Predictors of reading literacy for first and second language learners. *Reading and Writing: An Interdisciplinary Journal, 24,* 413-425. doi: 10.1007/s11145-010-9234-2

Oakhill, J., & Cain, K. (2007). Issues of causality in children's reading comprehension. In D. McNamara (Ed.), *Reading comprehension strategies: Theories, interventions, and technologies* (pp. 47-71). Mahwah, NJ: Lawrence Erlbaum.

Oakhill, J. V., & Cain, K. (2012). The precursors of reading ability in young readers: Evidence from a four-year longitudinal study. *Scientific Studies of Reading, 16,* 91-121. doi: 10.1080/10888438.2010.529219

Oakhill, J., Hartt, J., & Samols, D. (2005). Levels of comprehension monitoring and working memory in good and poor comprehenders. *Reading and Writing: An Interdisciplinary Journal*, *18,* 657-686. doi: 10.1007/s11145-005-3355-z

Orellana García, P. (2018). To what extent is reading motivation a significant predictor of reading achievement when controlling for language and cognitive achievement? A systematic review. In P. Orellana García & P. Baldwin Lind (Eds.), *Reading achievement motivation in boys and girls: Field studies and methodological approaches* (pp. 79-96). Cham, Switzerland: Springer International.

Palincsar, A. S., & Brown, A. L. (1984). Reciprocal teaching of comprehension-fostering and monitoring activities. *Cognition and Instruction*, *1,* 117-175. doi: 10.1080/0144341880080105

Perfetti, C. A., Landi, N., & Oakhill, J. (2005). The acquisition of reading comprehension skill. In M. J. Snowling & C. Hulme (Eds.) *The science of reading: A handbook* (pp. 227-247). Oxford, UK: Blackwell.

Pressley, M., & Afflerbach, P. (1995). *Verbal protocols of reading: The nature of constructively responsive reading*. Hillsdale, NJ: Lawrence Erlbaum.

Pressley, M., Forrest-Pressley, D. L., Elliott-Faust, O. J., & Miller, G. E. (1985). Children's use of cognitive strategies, how to teach strategies, and what to do if they can't be taught. In M. Pressley & C. I. Brainerd (Eds.), *Cognitive learning and memory in children* (pp. 1–47). New York, NY: Springer-Verlag.

Pressley, M., & Harris, K. R. (2006). Cognitive strategies instruction: From basic research to classroom instruction. In P. A. Alexander & P. Winne (Eds.), *Handbook of educational psychology* (2nd ed., pp. 265-286). New York, NY: Macmillan.

Proctor, C. P., Carlo, M., August, D., & Snow, C. (2005). Native Spanish-speaking children reading in English: Toward a model of comprehension. *Journal of Educational Psychology*, *97,* 246-256. doi: 10.1037/0022-0663.97.2.246

Proctor, C. P., Daley, S., Louick, R., Leider, C. M., & Gardner, G. (2014). How motivation and engagement predict reading comprehension among native English-speaking and English learning middle school students with disabilities in a remedial reading curriculum. *Learning and Individual Differences: Journal of Psychology and Education, 36,* 76-83. doi: 10.1016/j.lindif.2014.10.014

Proctor, C. P., & Louick, R. (2018). Development of vocabulary knowledge and its relationship with reading comprehension among emergent bilingual children: An overview. In A. Bar-On & D. Ravid, (Eds.), *Handbook of communication disorders: Theoretical, empirical, and applied linguistics perspectives* (pp. 643-655). Boston: De Gruyter Mouton.

Protacio, M. S., & Jang, B. G. (2016). ESL teachers' perceptions about English learners' reading motivation. *Literacy Research: Theory, Method, and Practice, 65,* 166-181. doi: 10.1177/2381336916661532

Reeve, J. (2012). A self-determination theory perspective on student engagement. In S. Christensen, A. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 149-173). New York, NY: Springer Science.

Roebers, C. M., & Feurer, E. (2016). Linking executive functions and procedural metacognition. *Child Development Perspectives, 10*, 39–44. doi: 10.1111/cdep.12159

Rosenshine, B., & Meister, C. (1994). Reciprocal teaching: A review of the research. *Review of Educational Research, 6,* 479-530. doi: 10.2307/1170585

Royer, J. M., & Carlo, M. S. (1991). Transfer of comprehension skills from native to second language. *Journal of Reading, 34,* 450-455. Retrieved from https://onlinelibrary.wiley.com/journal/14679817

Rubin, D. B. (1996). Multiple imputation after 18+ years. *Journal of the American Statistical Association*, *91,* 473-489. doi: 10.1080/01621459.1996.10476908

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25,* 54-67. doi: 10.1006/ceps.1999.1020

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.

Schiefele, U., & Schaffner, E. (2016). Factorial and construct validity of a new instrument for the assessment of motivation. *Reading Research Quarterly, 51,* 221-237. doi: 10.1002/rrq.134

Schiefele, U., Schaffner, E., Moller, J., & Wigfield, A. (2012). Dimensions of reading motivation and their relation to reading behavior and competence. *Reading Research Quarterly, 47,* 427-463. doi: 10.1002/RRQ.030

Schrank, F. A., Mather, N., & McGrew, K. S. (2014). *Woodcock-Johnson IV tests of achievement*. Rolling Meadows, IL: Riverside.

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and non-experimental studies: New procedures and recommendations. *Psychological Methods, 7,* 422-445. doi: 10.1037/1082-989X.7.4.422

Snow, C. (2002). *Reading for understanding: Toward an R&D program in reading* *comprehension.* Santa Monica, CA: RAND Corporation. Retrieved from https://www.rand.org/pubs/monograph_reports/MR1465.html

Snow, C. (2018). Simple and Not-So-Simple Views of Reading. *Remedial and Special Education, 39,* 331--316. doi: 10.1177/0741932518770288

Snow, C. E., & Biancarosa, G. (2003). *Adolescent literacy and the achievement gap: What do we know and where do we go from here?* New York, NY: Carnegie Corporation of New York.

Stahl, S. A., & Fairbanks, M. M. (1986). The effects of vocabulary instruction: A model-based meta-analysis. *Review of Educational Research, 56,* 72-110. doi: 10.2307/1170287

Taboada, A., Tonks, S. M., Wigfield, A., & Guthrie, J. T. (2009). Effects of motivational and cognitive variables on reading comprehension. *Reading and Writing, 22*, 85-106. doi: 10.1007/s11145-008-9133-y

Taboada, A., Townsend, D., & Boynton, M. J. (2013). Mediating effects of reading engagement on the reading comprehension of early adolescent English language learners. *Reading & Writing Quarterly*, *29*, 309-322. doi: 10.1080/10573569.2013.741959

Taboada Barber, A., Buehl, M. M., Beck, J. S., Ramirez, E. M., Gallagher, M.,...Archer, C. J. (2018). Literacy in social studies: The influence of cognitive and motivational practices on the reading comprehension of English Learners and Non-English Learners. *Reading & Writing Quarterly, 34*, 79-97. doi: 10.1080/10573569.2017.1344942

Taboada Barber, A., Buehl, M. M., Kidd, J., Sturtevant, E., Richey, L. N., & Beck, J. (2015). Reading engagement in social studies: Exploring the role of a social studies literacy intervention on reading comprehension, reading self-efficacy, and engagement in middle school students with different language backgrounds. *Reading Psychology*, *36*, 31-85. doi: 10.1080/02702711.2013.815140

Thissen, D., Steinberg, L., & Kuang, D. (2002). Quick and easy implementation of the Hochberg procedure for controlling the false positive rate in multiple comparisons. *Journal of Educational and Behavioral Statistics, 27,* 77-83. doi: 10.3102/10769986027001077

Tofghi, D., & MacKinnon, D. P. (2011). RMediation: An R package for mediation analysis confidence intervals. *Behavior Research Methods, 43,* 692-700. doi: 10.3758/s13428-011-0076-x

Torppa, M., Tolvanen, A., Poikkeus, A., Eklund, K., Lerkkanen, M., Leskinen, E., & Lyytinen, H. (2007). Reading development subtypes and their early characteristics. *Annals of Dyslexia: An Interdisciplinary Journal of the International Dyslexia Association, 57,* 3-52. doi: 10.1007/s11881-007-0003-0

Unrau, N., & Schlackman, J. (2006). Motivation and its relationship with reading achievement in an urban middle school. *The Journal of Educational Research, 100,* 81-101. doi: 10.3200/JOER.100.2.81-101

Wang, J. H., & Guthrie, J. T. (2004). Modeling the effects of intrinsic motivation, extrinsic motivation, amount of reading, and past reading achievement on text comprehension between U.S. and Chinese students. *Reading Research Quarterly*, *39,* 162-186. doi: 10.1598/RRQ.39.2.2

Wigfield, A., & Guthrie, J. T. (1997). Relations to children's motivation for reading to the amount and breadth of their reading. *Journal of Educational Psychology, 89,* 420-432. doi: 10.1037/0022-0663.89.3.420

Wolters, C. A., Denton, C. A., York, M. J., & Francis, D. J. (2014). Adolescents' motivation for reading: Group differences and relation to standardized achievement. *Reading and Writing: An Interdisciplinary Journal*, *27,* 503-533. doi: 10.1007/s11145-013-9454-3

Table 1

Sample Demographics

	Full sample (%) (*n* = 354)	Dual Language Learners (%) (*n* = 188)	English Speakers (%) (*n* = 166)
Grade			
Fourth	53.7	52.4	54.7
Fifth	46.3	47.6	45.3
FARMS status			
FARMS	83.5	88.6	77.6
No FARMS	16.5	11.4	22.4
Gender			
Female	49.1	44.9	54.0
Male	50.9	55.1	46.0
Ethnicity/race			
Hispanic	64.7	95.1	29.8
Black	28.3	.5	60.2
White	3.8	1.6	6.2
Multi-racial	.9	0	1.9
Native Hawaiian/ Pacific Islander	.3	.5	0
Asian	2.0	2.2	1.9

Table 2

Correlation Matrix and Descriptive Statistics for Dual Language Learners (DLLs) and English Speakers (ESs)

	RC-Fa	WI-Fa	LC-Fa	CS-Fa	RE-Fa	RC-Sp	WI-Sp	LC-Sp	CS-Sp	RE-Sp	IM-Sp	EM-Sp
RC-Fa	—	.65	.69	.41	.47	.63	.55	.49	.39	.42	.10	-.12
WI-Fa	.75	—	.51	.44	.59	.69	.77	.51	.46	.57	.10	-.04
LC-Fa	.67	.52	—	.48	.35	.54	.48	.74	.48	.30	.10	-.06
CS-Fa	.47	.32	.52	—	.39	.46	.40	.58	.68	.28	.00	-.20
RE-Fa	.26	.24	.06	.12	—	.52	.55	.42	.40	.80	.21	-.07
RC-Sp	.71	.69	.59	.46	.23	—	.81	.61	.48	.54	.15	-.12
WI-Sp	.63	.80	.45	.27	.23	.72	—	.58	.48	.51	.15	-.04
LC-Sp	.65	.52	.80	.56	.08	.66	.51	—	.66	.32	.15	-.06
CS-Sp	.48	.35	.55	.73	.14	.52	.33	.66	—	.37	.05	-.12
RE-Sp	.35	.35	.22	.17	.72	.34	.33	.19	.24	—	.16	-.07
IM-Sp	.06	.07	-.03	-.09	.35	.06	.09	-.04	-.09	.32	—	.44
EM-Sp	.00	.01	-.07	-.17	.29	-.09	-.01	-.05	-.12	.26	.60	—
ELs												
Mean	25.89	49.19	40.07	35.30	26.56	28.55	51.64	41.71	37.16	26.80	3.02	3.18
St Error	.41	.91	.76	.97	.81	.42	.73	.67	.93	.77	.05	.05
ESs												
Mean	28.81	53.42	46.04	37.46	27.45	30.89	55.40	47.80	39.58	27.18	2.91	3.11
St Error	.39	.94	.65	.87	.95	.50	.85	.68	.82	.99	.06	.05

Note. Values for DLLs appear below the diagonal; values for ESs appear above the diagonal. Adjusted standard errors are reported to accommodate the dependency of students within classrooms. LS = language status, coded such that ES = 0, DLL = 1; WI = word identification; LC = linguistic comprehension; CS = cognitive strategies; RE = reading engagement; IM = internal motivation; EM = extrinsic motivation. Fa = fall; Sp = spring.

Table 3

Summary of Multiple Hierarchical Regression Predicting Fall Reading Comprehension Performance

		β (SE)						
Model	Independent variables	LS	WI	LC	CS	RE	R^2	ΔR^2
1	LS	-.31 (.06)					.10	
2	LS + WI + LC + CS	-.02 (.05)	.36 (.05)‡	.34 (.10)†	.05 (.07)		.66	.56
3	LS + WI + LC + CS + RE	-.04 (.05)	.41 (.06)‡	.43 (.11)‡	.04 (.07)	.10 (.04)*	.67	.01

Note. Utilizing multiple imputation procedures in combination with linearized standard error estimation procedures does not allow us to perform F-tests for the change in R-square between hierarchical models. However, for those model comparisons where the model differs by only one predictor, the unique significance determined by the new predictor's t-test value provides the significance of the change in R-Square. LS = language status, coded such that ES = 0, DLL = 1; WI = word identification; LC = linguistic comprehension; CS = cognitive strategies; RE = reading engagement. * $p \leq .05$; † $p \leq .01$; ‡ $p \leq .001$.

Table 4

Summary of Multiple Hierarchical Regression Predicting Spring Reading Comprehension Performance

		β (SE)								
Model	Independent variables	LS	WI	LC	CS	IM	EM	RE	R^2	ΔR^2
1	LS	-.26 (.06)‡	--	--	--	--	--	--	.07	--
2	LS + WI + LC + CS	.01 (.04)	.59 (.06)‡	.26 (.07)‡	.10 (.06)	--	--	--	.68	.61
3	LS + WI + LC + CS + IM + EM	.01 (.04)	.58 (.06)‡	.26 (.07)‡	.09 (.06)	.08 (.04)*	-.11 (.05)*	--	.69	.01
4	LS + WI + LC + CS + IM + EM + RE	.00 (.04)	.53 (.06)‡	.28 (.07)‡	.06 (.06)	.06 (.04)	-.08 (.09)	.13 (.04)†	.70	.01

Note. Utilizing multiple imputation procedures in combination with linearized standard error estimation procedures does not allow us to perform F-tests for the change in R-square between hierarchical models. However, for those model comparisons where the model differs by only one predictor, the unique significance determined by the new predictor's t-test value provides the significance of the change in R-Square. LS = language status, coded such that ES = 0, DLL = 1; WI = word identification; LC = linguistic comprehension; CS = cognitive strategies; RE = reading engagement; IM = internal motivation. EM = extrinsic motivation. * $p \leq .05$; † $p \leq .01$; ‡ $p \leq .001$.

Table 5

Summary of Multiple Hierarchical Regressions Predicting Reading Comprehension Growth from Fall to Spring

	β (SE)							
	RC	LS	RE	WI	LC	CS	R^2	ΔR^2
Model 1								
RC + LS	.68 (.07)‡	-.04 (.06)	--	--	--	--	.48	--
Version 1 – Model 2								
RC + LS + RE	.62 (.08)‡	-.05 (.05)	.15 (.06)*	--	--	--	.50	.02
Version 2 – Model 2								
RC + LS + WI + LC + CS	.25 (.07)‡	-.02 (.04)	--	.41 (.05)‡	.12 (.06)*	.14 (.05)*	.60	.12
Model 3								
RC + LS + RE + WI + LC + CS	.23 (.07)†	-.02 (.04)	.08 (.06)	.38 (.05)‡	.14 (.06)*	.13 (.05)*	.61	.11

Note. All independent variables were measured at Time 1; the dependent variable was measured at Time 2. Utilizing multiple imputation procedures in combination with linearized standard error estimation procedures does not allow us to perform F-tests for the change in R-square between hierarchical models. However, for those model comparisons where the model differs by only one predictor, the unique significance determined by the new predictor's t-test value provides the significance of the change in R-Square. RC = reading comprehension; LS = language status, coded such that ES = 0, DLL = 1; WI = word identification; LC = linguistic comprehension; CS = cognitive strategies; RE = reading engagement. * $p \leq .05$; † $p \leq .01$; ‡ $p \leq .001$.

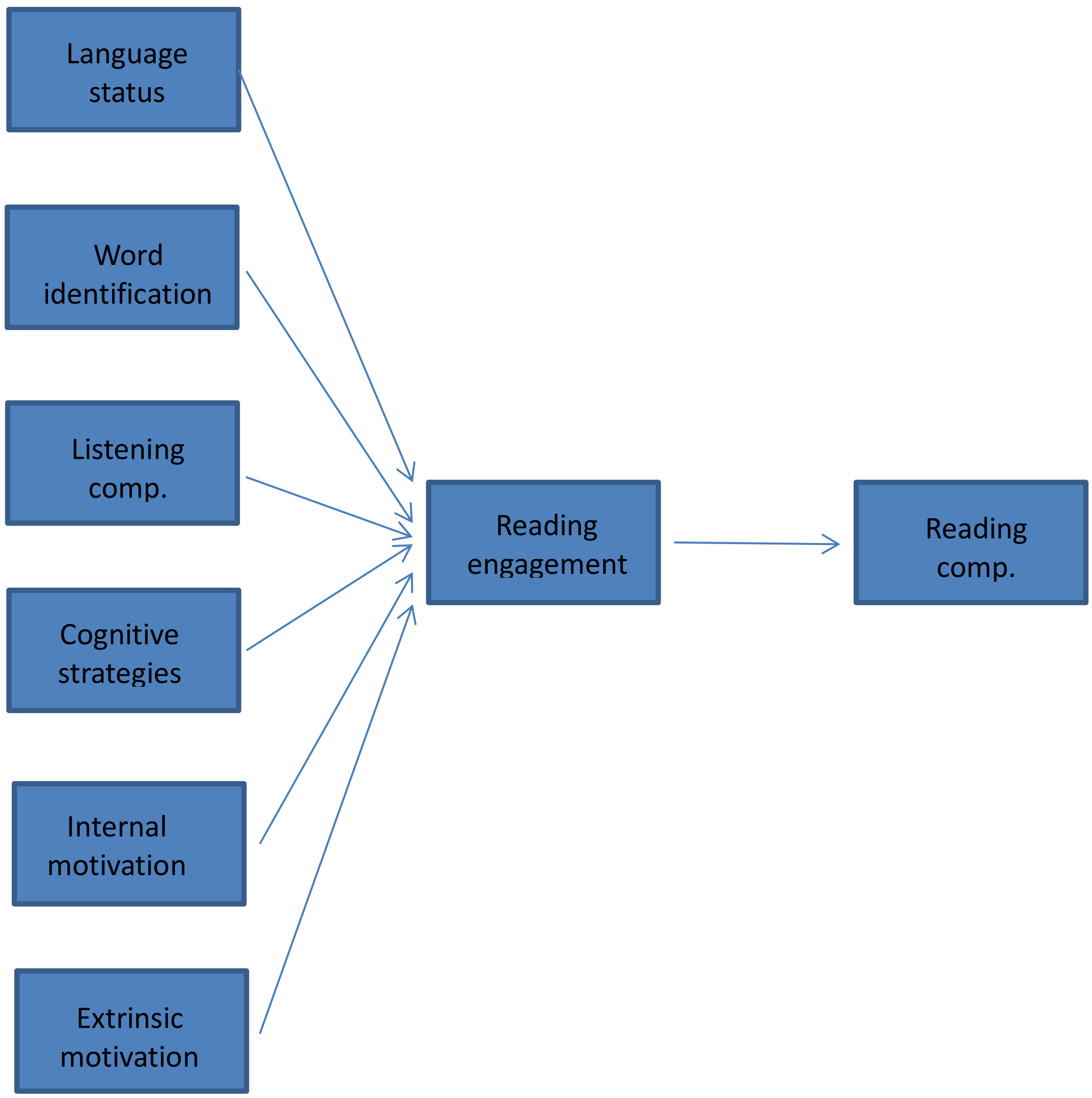

Figure 1. Mediation model tested to address Question 2b.

Online Resource 1

Cognition, Motivation, and Engagement as Factors in the Reading Comprehension of Dual Language Learners and English Speakers: Unified or Distinctive Models?

Correlation Matrix and Descriptive Statistics for Full Sample

	LS	RC-Fa	WI-Fa	LC-Fa	CS-Fa	RE-Fa	RC-Sp	WI-Sp	LC-Sp	CS-Sp	RE-Sp	IM-Sp	EM-Sp
LS	—												
RC-Fa	-.31	—											
WI-Fa	-.24	.72	—										
LC-Fa	-.39	.72	.55	—									
CS-Fa	-.14	.45	.39	.51	—								
RE-Fa	-.05	.37	.41	.21	.25	—							
RC-Sp	-.26	.69	.71	.60	.47	.38	—						
WI-Sp	-.23	.62	.80	.50	.35	.40	.78	—					
LC-Sp	-.44	.62	.55	.81	.56	.25	.66	.58	—				
CS-Sp	-.17	.46	.42	.54	.72	.27	.52	.42	.66	—			
RE-Sp	-.02	.37	.45	.25	.22	.76	.44	.42	.24	.30	—		
IM-Sp	.11	.04	.05	-.02	-.06	.27	.08	.09	.00	-.04	.24	—	
EM-Sp	.07	-.08	-.03	-.08	-.19	.10	-.12	-.04	-.08	-.13	.09	.52	—
Mean	.51	27.26	51.16	42.87	36.31	26.08	29.65	53.40	44.57	38.29	26.98	2.97	3.15
St Error	.04	.33	.74	.62	.74	.68	.35	.60	.60	.69	.73	.04	.04

Note. Adjusted standard errors are reported to accommodate the dependency of students within classrooms. LS = language status, coded such that ES = 0, DLL = 1; WI = word identification; LC = linguistic comprehension; CS = cognitive strategies; RE = reading engagement; IM = internal motivation; EM = extrinsic motivation. Fa = fall; Sp = spring.

Online Resource 2 for

Cognition, Motivation, and Engagement as Factors in the Reading Comprehension of Dual Language Learners and English Speakers: Unified or Distinctive Models?

Motivations for Reading Questionnaire (Revised): Full Description

The updated MRQ (see Appendix was designed to be appropriate for both English Speakers (ESs) and Dual Language Learners (DLLs) in the Grades 2-5, whereas older versions were geared more toward ESs in Grade 4 and above. In addition, it focused on just 5 of the 11 dimensions of reading motivation previously identified (Wigfield & Guthrie, 1997), so that it could be administered in 15-20 minutes and not overwhelm the youngest students.

In revising the MRQ, our aim overall was to shorten and clarify existing items in order to make it easier for students to understand the items and select responses matching how they felt (DeVellis, 1991; Pett, Lackey, & Sullivan, 2003). We ensured that all items were positively worded (e.g., "I know that I will do well in reading next year."/"I am a good reader.") based on findings that younger children have difficulty processing statements that contain negative words ("I don't know that I will do well in reading next year.") as well as those with negative concepts ("I am a poor reader.") (Akiyama & Guillory, 1983; Chapman & Tunmer, 1995). In addition, we added four new items to the self-efficacy scale, which originally included three items focused on students' beliefs about their reading ability in general, to capture students' confidence in particular reading skills, such as sounding out words and reading with expression.

Altogether, the updated MRQ includes 30 items, representing five dimensions, selected for their established reliability and relations with reading achievement in past research (e.g., Baker & Wigfield, 1999; Neugebauer, 2014; Wang & Guthrie, 2004), as well as their relevance to the goals of the larger project encompassing the present study. The dimensions are self-efficacy (7 items), two intrinsic motivations – involvement (7 items) and curiosity (5 items) – and two extrinsic motivation dimensions – competition (6 items) and recognition (5 items). All items appear in the table below. Students responded to the items on a 4-point scale that used different labels than the original MRQ, but the points were explained to students with the same meanings. That is, students were instructed to pick *YES!!* if the item was a lot like them, *yes* if it was a little like them, *no* if it was a little different from them, and *NO!!* if it was very different from them. The use of these response labels was based on other studies of academic motivation including students as young as second graders (Hamilton, Nolen, & Abbott, 2013; Nicholls, Cobb, Wood, Yackel, & Patashnick, 1990).

A composite score for internal motivation was created by averaging scores on the involvement, curiosity, and self-efficacy dimensions. Similarly, a composite score for extrinsic motivation was created by averaging scores on the competition and recognition dimensions. The rationale for creating these composites was both conceptual and empirical. Combining self-efficacy with involvement and curiosity aligns with the composition of the REI used in this and past studies (e.g., Guthrie et al., 2007; Taboada, Tonks, Wigfield, & Guthrie, 2009; Taboada, Townsend, & Boynton, 2013) and the motivation scale constructed by Froiland and Oros (2013) in their study of fifth- to eighth-graders. In addition, based on factor analyses (using principal axis factoring with direct oblimin rotation), a 2-factor model reflecting these two composites emerged as the most appropriate factor solution.

Cronbach's alpha reliability values for the internal and extrinsic composites for this sample are .85 and .83, respectively.

MRQ (Revised) Items

Involvement
1) I read stories.
2) I feel like I can make friends with characters in good books.
4) I love reading mysteries.
6) I read a lot of adventure stories.
8) I really enjoy a long story.
28) If I am reading about something interesting, time passes very quickly.
30) I make pictures in my mind when I read.

Curiosity
3) If the teacher talks about something interesting I would read more about it on my own time.
5) I have favorite things that I like to read about.
7) I read to learn more about my hobbies.
9) I read to learn new things.
27) I love to read about new things.

Efficacy
11) I read aloud with good expression in class.
13) I know I will do well in reading next year.
17) I understand most of the books that I read for school.
21) I can usually sound out new words.
23) I am a good reader.
25) I can figure out the meanings of new words in books that I read.
29) I learn a lot from reading.

Competition
10) I try to finish my reading before other students.
12) I want to be the only one who knows the answer to a reading question.
14) I would love to be on a list of good readers.
16) I work hard to read better than my friends.
18) I want to be the best at reading in my class.
19) I try to get more answers right than my friends.

Recognition
15) I want my teacher to say that I read well.
20) I love it when others say nice things about my reading.
22) I am happy when someone says that I have been reading well.
24) I love it when my parents tell me I'm doing a good job in reading.
26) I love it when my friends tell me I'm a good reader.