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How motivation and engagement predict reading comprehension among native English-speaking and English-learning middle school students with disabilities in a remedial reading curriculum

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ABSTRACT

The present study examined self-reported levels of motivation in predicting reading comprehension among 76 linguistically diverse middle school-aged students with disabilities in an urban Northeastern school district in the United States. Fifty-one percent of the students were English language learners (ELLs), and all were enrolled in READ180, an online and classroom-based, commercial reading program designed to promote comprehension for students who struggle with reading. Controlling for time spent in READ180 and formative vocabulary and comprehension performance within the environment, we investigated whether reading-related motivations (intrinsic motivation; extrinsic motivation; self-efficacy) predicted comprehension outcomes, and whether language status (ELL or non-ELL) moderated any relationships with reading comprehension. Self-efficacy was positively and significantly associated with reading comprehension, while intrinsic motivation and extrinsic motivation were not. The effect of self-efficacy was not moderated by ELL status and ELL students scored significantly below their non-ELL peers on the measure of reading comprehension.

1. Introduction

The content-area texts used in secondary school settings are linguistically complex, demanding that readers deploy a host of cognitive strategies alongside well-developed language skills in order to acquire and synthesize information (Biancarosa & Snow, 2004). In the reading literature, two groups of students emerge as particularly vulnerable to low reading levels: English language learners (ELLs) and students with disabilities. Specifically, 70% of ELLs performed Below Basic on the 2013 National Assessment of Educational Progress (NAEP; NCES, 2013) assessment, with 27% of students performing at the Basic level, and only 3% Proficient. Similar results accrued to students with disabilities (60% Below Basic, 31% Basic, 8% Proficient, 1% Advanced). By way of contrast, overall, 64% of eighth graders in the United States performed at a Below Basic (22%) or Basic (42%) reading level, with 32% and 4% performing at the Proficient and Advanced levels, respectively. Importantly, NAEP reading results for ELLs with disabilities are not reported, leaving the field with limited information about the reading achievement of this very vulnerable sub-group of students.

Arguably the majority of reading research focuses on literacy skills (e.g. phonemic awareness, word reading, fluency), language proficiency (e.g., phonological awareness, academic vocabulary, discourse), and cognitive strategies (predictions, summarizations, clarifications) for reading, and the roles these linguistic and cognitive variables play in predicting text comprehension (see Kamil, Pearson, Moje, & Afflerbach, 2011 for a broad overview). However, the role of motivation as a predictor of reading comprehension is far less studied, despite its hypothesized impact on the choices students make about how often and how much they will read (Wigfield & Guthrie, 1997). Indeed, positive correlations have been found between students' motivation levels and reading comprehension (Lau & Chan, 2003; Wigfield & Guthrie, 1997), and there is some evidence suggesting that certain motivational constructs operate similarly for students with and without learning disabilities (Sideridis, 2009).

Far less research, however, exists with respect to the role of motivation in predicting reading comprehension among: a) bilingual and ELL populations; b) students with relatively low-incidence disabilities; and c) bilingual and ELL populations with such disabilities. Therefore, the express intent of the current research was to examine the relationship of motivation with reading comprehension among a sample of students with disabilities, including those who speak languages other than English.

The study of motivation and reading comprehension requires that one attend to different motivational constructs that theoretically affect a student's desire to read. Several dimensions of motivation have been previously identified, and we focus on three that have emerged as

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particularly salient for reading and that may be differentially important for vulnerable populations: intrinsic motivation, extrinsic motivation, and self-efficacy.

1.1. Intrinsic and extrinsic motivation

Two of the most common constructs in the motivation literature are intrinsic motivation, or "a concern with learning and mastering the task using self-set standards and self-improvement", and extrinsic motivation, which represents "a focus on getting good grades and pleasing others" (Pintrich, 1999, p. 466). When specifically considering motivation for reading, intrinsic motivation reflects the extent to which students are motivated by their: a) curiosity about reading; b) perceived importance of being a good reader; or c) level of involvement with text when they read (Guthrie, Hoa, Wigfield, Tonks, & Perencevich, 2006; Lee & Zentall, 2012; Logan, Medford, & Hughes, 2011). Extrinsic motivation has been characterized as the extent to which students' reading behavior is influenced by external elements such as positive reinforcement for reading performance (recognition), general sense of reading aptitude relative to peers (i.e., competition; Guthrie et al., 2006), grades (DeNaeghel, Van Keer, Vansteenkiste, & Rosseel, 2012; Lau & Chan, 2003; Lee & Zentall, 2012), and students' perceived need to complete school-related tasks simply because they have been assigned (i.e., compliance; Wang & Guthrie, 2004).

Research generally suggests a positive relationship between intrinsic motivation and reading comprehension (Taboada, Tonks, Wigfield, & Guthrie, 2009; Schaffner & Schiefele, 2013; Wang & Guthrie, 2004). In contrast, extrinsic motivation has been negatively associated with reading outcomes (Wang & Guthrie, 2004). In the few studies that have compared motivation and reading for different racial and ethnic groups, intrinsic motivation emerged as a predictor of reading comprehension among White American students, but not among Black American students (Guthrie, Coddington, & Wigfield, 2009) nor among Latino/a students (Unrau & Schlackman, 2006).

1.2. Self-efficacy

Another construct used to understand the impact of motivation on reading comprehension is self-efficacy (Lau & Chan, 2003; Lee & Zentall, 2012). Self-efficacious readers "participate more readily, work harder, and persevere longer in the face of difficulties, and achieve at a higher level" (Guthrie & Coddington, 2009, p. 505). Several studies have demonstrated that self-efficacy, or the related construct of perceived competence, predicts scores on standardized measures of reading comprehension (Chapman & Tunmer, 1995; Chiu & Chow, 2010; Mucherah & Yoder, 2008), and students with improved reading efficacy have stronger growth in comprehension than peers with consistently lower motivational profiles (Guthrie et al., 2007). On the other hand, international research that has examined the relationship between self-efficacy and reading comprehension has yielded null findings, both in Norway (Anmarkrud & Braten, 2009) and Kenya (Mucherah & Heredeen, 2013). In the U.S., studies of self-efficacy predicting reading comprehension among underrepresented groups are notably lacking.

1.3. Motivation research with students with disabilities

Just as intrinsic and extrinsic motivation and self-efficacy may function differently in relation to reading among different ethnic or cultural groups, these constructs have also been found to differ among students with disabilities. Motivation research uses a range of terminology to describe students with reading difficulties, making precise characterization difficult, but, overall, research suggests unique effects of motivation on reading. For example, "poor readers" have been found to have lower intrinsic motivation when compared to "good reader" peers (Lau & Chan, 2003), and levels of intrinsic motivation have been shown to more strongly predict variation in reading comprehension among low-performing readers than among high-achieving peers (Logan et al., 2011). Thus, the impact of motivation on reading may change depending on how students are labeled and grouped. Even in these studies of struggling readers, identification of disability is limited and the focus has been almost entirely on high-incidence learning disabilities. Ultimately, then, we know very little about the role of reading motivation for students with disabilities generally, and specifically, no research has been conducted that attempts to examine potential differences among disability subgroups.

1.4. Motivation research with bilingual and ELL students

Despite current trends toward studying the literacy development of bilingual and ELL children, we were unable to locate any literature that specifically examined the relationship between motivation and literacy outcomes among such groups in K–12 settings. However, there exists a robust research literature in the field of second language (L2) acquisition that targets motivation, both in terms of basic motivation to learn a L2 (e.g., Clément, 1980; Dörnyei, 1994; Gardner, 1985; MacIntyre, Clément, Dörnyei, & Noels, 1998; Noels & Clément, 1996) and with respect to the nature of motivation to learn a L2 within the language classroom (Heckhausen & Kuhl, 1985). Motivation within these contexts derives from either the degree to which learners are open to integrating into the cultural context in which the L2 is being acquired, or from their attitudes toward the classroom context in which the L2 is being learned (or both; see Csizér & Dörnyei, 2005; Dixon et al., 2012; Dörnyei & Csizér, 2005). With respect to the classroom context, recent longitudinal work with English-speaking adolescents learning Spanish as their L2 (Sparks, Patton, Ganschow, & Humbach, 2009) found that the inclusion of a broad motivation indicator in regression models explained 9% of unique variation in L2 (Spanish) reading comprehension.

The links between motivation for second language acquisition and literacy in K–12 settings share some commonalities, most notably in the domains of goal orientation, positivity, and self-efficacy. However, second language acquisition research typically targets adult learners of multiple languages and cultural backgrounds who are attempting to learn another language for societal integration (among immigrant groups) or for completing foreign language requirements in high school. These social and academic contexts distinguish motivational studies in second language acquisition from the current research.

1.5. The present study

Given the broad range of studies that have explored the relationships between motivation and reading outcomes among upper elementary and middle school-aged children, it is disconcerting that no research has focused on ELL children and that very little has targeted students with disabilities beyond the "struggling reader" categorization. English language learners and students with disabilities represent some of the most vulnerable children in U.S. schools today, groups for whom motivation may play a significant role in predicting reading outcomes, and more basic research is needed in this domain. Thus, the present study was guided by the following research questions:

1) In the context of a remedial reading program, what is the role of motivation in predicting reading comprehension among students with disabilities?
2) Does ELL status moderate any effects of motivation predicting reading comprehension?

2. Method

This study took place in an instructional setting that allowed us to focus specifically on the populations of interest: students with disabilities, approximately half of whom were English language learners. All students in the study were special education students (i.e., all had Individualized Education Plans) who received their reading instruction in self-contained classes. Students were placed into these classes only if they received special education services and had reading difficulties substantial enough that the district considered a separate, extended, and intensive remedial reading placement more appropriate than the typical inclusive English Language Arts classes.

2.1. Setting and participants

The participants were 76 middle-school students in grades 6 (n = 26, 34%), 7 (n = 28, 37%), and 8 (n = 22, 29%) at three schools in a single urban district in the Northeast. Across all three schools, there were 8 total teachers who taught in 16 substantially separate reading classes, which housed 154 total students. All 8 of these teachers consented to participate in the current study. Once teacher consent was acquired, permissions were sent home to all students' parents or guardians, inviting participation in the study. Of those 154 consent forms that were sent home, 76 (49%) were returned affirming participation. Table 1 displays the sample breakdown by sex, race/ethnicity, ELL status, low-income status, and disability category, disaggregated by school. The sample was 58% male, 51% of students were labeled as ELLs, and Latino/a students constituted the majority group in the sample (59%) and across all schools. Spanish was the predominant home language spoken by the ELL students (n = 25), however, other low incidence languages were also represented, including: Khmer/Khmai (n = 2), Somali (n = 2), Arabic (n = 1), Haitian Creole (n = 1), and Swahili (n = 1). Home language data were missing for 7 students. Fully 97% of the students were receiving free or reduced price lunch support, and children with primary diagnoses of intellectual disabilities and speech/language impairments constituted two-thirds of the overall sample, which was consistent across schools.

Table 1
N (%) of school and demographic characteristics for total sample and participating schools.

Characteristic	Sample (n = 76)	School 1 (n = 38)	School 2 (n = 17)	School 3 (n = 21)
Sex				
Female	32 (42%)	21 (55%)	3 (18%)	8 (38%)
Male	44 (58%)	17 (45%)	14 (82%)	13 (62%)
Race/ethnicity				
Latino	41 (59%)	18 (50%)	12 (75%)	11 (65%)
Black	9 (13)%	8 (22%)	1 (6%)	n/a
Asian	2 (3%)	1 (3%)	n/a	1 (6%)
White	15 (22%)	7 (19%)	3 (19%)	5 (29%)
Native American	1 (1.5%)	1 (3%)	n/a	n/a
Mixed race	1 (1.5%)	1 (3%)	n/a	n/a
Language status				
ELL	39 (51%)	19 (50%)	13 (76%)	7 (33%)
Low income	67 (97%)	32 (97%)	17 (100%)	16 (94%)
Disability category				
Intellectual disability	29 (38%)	16 (42%)	9 (53%)	4 (19%)
Speech/language impairment	22 (29%)	8 (21%)	5 (29%)	9 (42%)
Communication	5 (7%)	3 (8%)	1 (6%)	1 (5%)
Autism/developmental delay	5 (7%)	3 (8%)	1 (6%)	1 (5%)
Emotional disability	4 (5.5%)	4 (11%)	0 (0%)	0 (0%)
Neurological	4 (5.5%)	0 (0%)	0 (0%)	4 (19%)
Specific learning disability	3 (4%)	2 (5%)	0 (0%)	1 (5%)
Other health impairment	3 (4%)	1 (3%)	1 (6%)	1 (5%)

Note. 7 total students were missing race/ethnicity data, and 9 total students were missing data on free or reduced price lunch enrollment. For race/ethnicity, School 1 had 2 cases missing data; at School 2, 1 student was missing data; at School 3, 4 students were missing data. For low income, School 1 had 5 cases of missing data and School 3 had 4 cases of missing data. Percentages for race/ethnicity are thus calculated based on reduced *n*s.

Table 2
Disability category disaggregated by ELL status.

Disability category	ELL	Non-ELL	Totals
Intellectual disability	17	12	29
Speech/language impairment	13	9	22
Communication	3	2	5
Autism/developmental delay	4	1	5
Emotional disability	0	4	4
Neurological	0	4	4
Specific learning disability	1	3	4
Other health impairment	1	2	3
Totals	39	37	76

Table 2 presents disability category disaggregated by language status (ELL or non-ELL). Intellectual disability (n = 29) and speech/language impairment (n = 22) comprised the largest disability categories, allowing us to conduct Chi-Square difference tests for the distribution of ELLs versus non-ELLs in these two categories. While some differences can also be seen between the two groups for other disability categories, the cell sizes were too small to merit testing. Chi-Square testing revealed no differences between the number of ELLs versus non-ELLs for intellectual disabilities (17 vs. 12 respectively; χ^2 (1,71) = .832, $p > .05$) nor for speech/language impairment (13 vs. 9, respectively; χ^2 (1,71) = .694, $p > .05$).

2.2. READ180 learning environment

Student sampling was stratified by a single criterion: READ180 enrollment. READ180 is a mixed-method remedial curriculum designed to improve a range of reading-related skills for struggling readers in grades 4–12 (Hasselbring & Goin, 2004; Slavin, Cheung, Groff, & Lake, 2008). The program model includes 90 min of instruction daily, consisting of several activities in a single class period. READ180 class begins with teacher-led whole group instruction, followed by students dividing into three rotations (small-group instruction, independent use of the software program, and independent/modeled reading) for 20 min each, and concluding as a whole group. It should be noted that not all schools or teachers were able to accommodate a 90-minute schedule, resulting in variability of rotations. All students, however, had daily experiences with the software rotation.

Students spent daily rotation time working in the READ180 Next Generation software, an adaptive program in which students move through different "zones" (Reading, Word, Spelling, and Success) that support the development of separate reading skills. This software, while only one component within the READ180 curriculum, provides a ready opportunity to study students' individual progress in reading. Overall, student participation in the various zones is geared toward providing background knowledge, supporting comprehension through non-fiction leveled texts, and targeting challenging words, with additional activities designed to support fluency, word-recognition skills, vocabulary, and comprehension.

While there is debate about the effectiveness of the READ180 curriculum (see Kim, Samson, Fitzgerald, & Hartry, 2010), our purpose here was not to evaluate the curriculum for causal links between its use and student outcomes. Rather, READ180 was appealing for its digital logs, which provided an estimate of student use of, and performance in, the system. The READ180 data collected for the current study totaled 10 weeks of instructional time during the 2012–2013 academic year. All online student activity throughout the environment was logged, allowing for the calculation of overall time spent in the environment and of student performance on the formative measures that are embedded within the system (see Measures section). Thus, usage and performance data were deployed as controls, allowing us to ask experimental

questions about motivation and reading outcomes for this unique population.

2.3. Measures

A limited set of measures was collected for the present study. As reported, all students had documented disabilities and 51% were labeled as ELLs. All relevant variables are described in the following sub-sections.

2.3.1. Reading comprehension

Our primary outcome measure was performance on the Scholastic Reading Inventory (SRI), a computer-adaptive measure that schools typically use in conjunction with the READ180 curriculum. An untimed measure, the SRI uses both fiction and expository texts and is designed to measure various elements of reading comprehension including reading for details, drawing conclusions, and making comparisons and generalizations (Scholastic, Inc., 2007). Items use what the developers term as an "embedded completion" format in which students read a short passage, then select from a set of four words to fill in the blank in a sentence about the passage. The test is adaptive such that students are presented with different items depending on previous item performance.

The SRI provides results in the form of a lexile scale score, reflecting the lexile framework of text complexity developed by MetaMetrics (Stenner, Burdick, Sanford, & Burdick, 2007). The lexile scale score has been shown to correlate highly with standardized measures of reading in linking studies. For example, the correlation between lexile and standardized scores on the Gates–MacGinitie Reading Test (Version 4) was .92, while SRI performance correlated .80 with the Stanford Achievement Test, and 0.65 with the Stanford Diagnostic Reading Test (Scholastic, Inc., 2007). The consistency of lexile results for individual students when retested after four months ranges between .83 and .90 across grade.

2.3.2. READ180 formative comprehension performance

We controlled for formative performance on embedded reading comprehension measures using the average percent correct on "quick check" items in the Reading Zone that focused on comprehension. These multiple-choice items required students to identify the main idea of a passage, summarize, sequence events, read for detail, make inferences, identify cause and effect, compare and contrast, and identify problems and solutions. Students were presented with up to three comprehension questions during each READ180 session, and a total of ten comprehension questions accompanied each reading passage. Percentage correct served as a control for comprehension of the passages read during the intervention period.

2.3.3. READ180 formative vocabulary performance

We also used the average percent correct on "quick check" vocabulary items in the Reading Zone. Like the comprehension "quick check", these were multiple-choice items focused on choosing correct definitions of words used in a related reading passage. Students were presented with up to three vocabulary questions during each READ180 session and answered a total of five vocabulary questions for each passage. Percentage correct served as a control for existing or accumulating vocabulary knowledge during the intervention period.

2.3.4. Time spent in READ180

The READ180 usage log provides a sum of the total number of minutes logged in each of the four main software zones: Reading, Word, Spelling, and Success. These total time scores were calculated (in minutes) for the 10-week intervention period.

2.3.5. Motivation for Reading Questionnaire (MRQ)

The Motivation for Reading Questionnaire (MRQ) was designed by Wigfield and Guthrie (1997) and has been used, in one form or another, in a number of studies (Anmarkrud & Braten, 2009; Bozack, 2011; DeNaeghel et al., 2012; Guthrie et al., 2006; Lau & Chan, 2003; Logan et al., 2011; Mucherah & Heredeen, 2013; Mucherah & Yoder, 2008; Wang & Guthrie, 2004). It consists of 11 subscales, including reading efficacy; challenge; curiosity; reading involvement; importance; recognition; grades; social; competition; compliance; and reading work avoidance. Researchers have collapsed the 8 most commonly used subscales to create super scales of Intrinsic and Extrinsic motivation (e.g., Guthrie et al., 2006; Lee & Zentall, 2012), or other research-based subscales related to motivation (DeNaeghel et al., 2012; Lau & Chan, 2003). Rather than conduct our own exploratory factor analyses, we were guided by our review of the extant research, from which we derived the following three super scales for reading motivation: Self-Efficacy & Reading Challenge ($\alpha = 0.767$), Intrinsic Motivation ($\alpha = 0.813$), and Extrinsic Motivation ($\alpha = 0.796$).

Given that reading comprehension was a documented struggle for all participants, the MRQ was group-administered by researchers reading the items aloud. Students marked their responses to MRQ statements on a 1 (*very different from me*) to 4 (*a lot like me*) scale. Averages of responses were generated for each subscale and superscale, resulting in a potential response range of 1–4 for all items, subscales, and superscales. Table 3 also presents an overview of the subscales that comprise each superscale and disaggregated by ELL status. See Appendix A for specific MRQ items as they are associated with each subscale. No significant between-group differences were found on any MRQ super scales as a function of ELL versus non-ELL status (all *F*s between .047 and .865, all *p*s > .05). We had no theoretically driven reason to test for grade-level differences on the MRQ, and thus did not perform those analyses.

2.4. Procedures

Data were collected over the course of a 10-week period in the middle of the academic year. This ensured that students were not new to the READ180 program, and routines for moving from rotation to rotation were well established. We administered the MRQ before the start of the target period. Teachers administered the SRI via computer within two to three weeks after the end of the participation period. Data from within the READ180 software program were downloaded from the back-end data collection system.

Table 3
Cronbach's alpha and means (SD) for superscales and related subscale items, for total sample and disaggregated by language status (ELL, non-ELL).

Superscales	Subscales	α	Sample	ELL	Non-ELL
Self-efficacy		.767	2.77 (.695)	2.76 (.732)	2.79 (.667)
	Self-efficacy	.730	2.93 (.788)	2.97 (.722)	2.89 (.860)
	Challenge	.725	2.63 (.755)	2.64 (.764)	2.62 (.759)
Intrinsic motivation		.813	2.98 (.596)	2.95 (.627)	3.00 (.572)
	Curiosity	.776	3.06 (.673)	3.00 (.750)	3.11 (.593)
	Involvement	.663	2.65 (.666)	2.55 (.749)	2.74 (.569)
	Importance	.735	3.22 (.763)	3.29 (.629)	3.15 (.866)
Extrinsic motivation		.796	2.98 (.528)	2.91 (.532)	3.05 (.521)
	Recognition	.664	2.86 (.707)	2.80 (.700)	2.92 (.719)
	Grade	.465	3.28 (.603)	3.26 (.633)	3.30 (.580)
	Competition	.812	2.88 (.778)	2.79 (.791)	2.96 (.768)
	Compliance	.455	2.88 (.569)	2.76 (.579)	2.99 (.543)

Table 4
Means (SD) for reading comprehension performance disaggregated by ELL-status.

	SRI reading comprehension	R180 total zone time	R180 comprehension performance	R180 vocabulary performance
Sample mean (SD)	547.60 (276.22)	539.93 (196.16)	76.73 (12.02)	79.22 (15.81)
Language status				
ELL	459.08 (250.29)	528.38 (193.62)	73.51 (13.19)	75.81 (17.62)
Non-ELL	638.51 (275.1)*	552.11 (200.74)	80.23 (9.61)*	82.93 (12.84)
Grade level				
Grade 6	462.92 (294.06)	498.12 (230.33)	72.72 (16.47)	76.58 (18.78)
Grade 7	607.07 (270.43)	610.68 (150.42)	78.03 (8.63)	78.81 (16.12)
Grade 8	568.14 (249.62)	499.32 (186.05)	79.56 (8.79)	82.68 (11.11)

* Non-ELL students significantly outperform ELL students at $p < .05$.

2.5. Data analysis

We began analyses by generating descriptive statistics to consider potential differences between ELL and non-ELL students on reading comprehension, system use and performance, and motivational constructs. In order to examine the relationship between motivational constructs and reading comprehension, we ran a series of blocked regression analyses in which we first assessed, as a baseline model, the effect of ELL status and total time spent in READ180. Next, we added formative assessment performance on READ180 comprehension and vocabulary as control variables. Finally, we tested our motivation variables (self-efficacy, intrinsic motivation, extrinsic motivation) as the key question predictors to test whether, controlling for time spent, ELL status, and formative performance, motivation predicted reading comprehension outcomes among students with disabilities.

3. Results

Table 4 summarizes the mean performance and standard deviations for SRI reading performance, time spent in READ180, and performance on the READ180 formative comprehension and vocabulary indicators. One-way analysis of variance (ANOVA) revealed that, for both SRI and embedded comprehension performance, non-ELL students significantly outperformed their ELL peers, $F(1,73) = 8.74$, $p < 0.05$ and $F(1,71) = 6.10$, $p < 0.05$, respectively. Differences on embedded vocabulary performance were approaching significance, $F(1,71) = 3.83$, $p = 0.054$, and there were no mean differences between these two groups on the total time spent in READ180, $F(1,74) = .275$, $p = .602$. Grade-level differences did not emerge for SRI performance ($F(2,72) = 2.48$, $p = 0.09$), time spent in READ180 ($F(2,73) = 3.04$, $p = 0.084$), embedded comprehension ($F(2,70) = 2.16$, $p = 0.123$), or embedded vocabulary ($F(2,70) = .819$, $p = 0.445$).

Table 5 displays the bivariate correlations between ELL status, all READ180 indicators, and the motivation variables of interest. ELL status was significantly and negatively correlated with both the SRI and embedded comprehension performance ($r = -.327$, $p < 0.05$ and $r = -.281$, $p < 0.01$, respectively). SRI performance was significantly related to embedded comprehension ($r = .340$, $p < 0.01$) and the Self-Efficacy motivation construct ($r = .374$, $p < 0.01$). Total zone time was not significantly correlated with any variable. The strongest correlations occurred between the three motivation constructs: Self-Efficacy and Intrinsic Motivation ($r = .729$, $p < 0.01$), Self-Efficacy and Extrinsic Motivation ($r = .586$, $p < 0.01$), and Intrinsic and Extrinsic Motivation ($r = .727$, $p < 0.01$).

Table 5
Correlation matrix for all modeled variables.

	1.	2.	3.	4.	5.	6.	7.
1. ELL status							
2. SRI performance	−.327*						
3. Embedded comprehension	−.281*	.340*					
4. Embedded vocabulary	−.226	.195	.677*				
5. Total zone time	−.061	.146	−.062	−.045			
6. Self-efficacy	−.022	.374*	.073	.042	−.007		
7. Intrinsic motivation	−.041	.171	.089	.022	−.010	.729*	
8. Extrinsic motivation	−.133	.118	.119	.054	.105	.586*	.727*

* $p < .05$.

Table 6 summarizes the model-building process for predicting SRI performance, accounting for ELL status and READ180 participation and performance. Since grade level differences were not significant, we did not include grade as a control in our regression models. Model 1 displays the baseline model, with ELL status and total time spent in READ180, and explained 12.3% of variation in SRI performance. The addition of the READ180 performance indicators in Model 2 explained an additional 7.4% of variation in the outcome, and also reflected a significant improvement in model fit ($F = 4.11$, $p < 0.01$). Model 3 tested the effects of the three motivation constructs: self-efficacy, intrinsic motivation, and extrinsic motivation. This model explained an additional 19.8% of variation, a significant improvement to model fit ($F = 5.41$, $p < 0.01$) with ELL status ($B = -175.51$, $p < 0.05$) and Self-Efficacy ($B = 212.10$, $p < 0.05$) as significant predictors of SRI performance, and embedded comprehension ($B = 6.38$, p = 0.06) approaching significance. No significant interactions between ELL status, READ180 performance variables, or motivation predictors were detected.

4. Discussion

In this study, we explored whether three established dimensions of motivation (self-efficacy, intrinsic, extrinsic) were associated with reading outcomes among a population of adolescent learners who all had diagnosed disabilities, and half of whom were ELLs. The motivation construct of self-efficacy emerged as a significant predictor of reading comprehension, controlling for time spent in the READ180 environment and formative vocabulary and comprehension performance. This effect held irrespective of whether a student was labeled as ELL.

We found no evidence of interactions between ELL status and the effects of motivation predicting reading. What did emerge, however, was a stark difference in reading comprehension performance such that the ELL students performed significantly lower than their non-ELL peers. These findings have varied implications, both for current understandings and for future research.

4.1. Self-efficacy as a wide-ranging predictor

The finding that students' self-reports with respect to self-efficacy significantly predicted reading comprehension performance converges with others in the motivation literature (Chapman & Tunmer, 1995;

Table 6
Regression models predicting SRI performance.

Parameter	Model 1		Model 2		Model 3	
	Est. (SE)	Standard est.	Est. (SE)	Standard est.	Est. (SE)	Standard est.
Intercept	539.84 (95.66)*		83.69 (258.12)		−2.32 (268.30)	
ELL status	−175.34 (60.67)*	−.334	−151.16 (63.32)*	−.274	−175.51 (58.50)*	−.337
Total time spent	.179 (.155)	–	.122 (.179)	–	.079 (.168)	–
READ180 performance						
Comprehension			7.38 (3.48)*	.312	6.38 (3.33)~	.285
Vocabulary			−1.09 (2.67)	–	−.403 (2.63)	–
Motivation (MRQ)						
Self-efficacy[a]					212.10 (58.23)*	.548
Intrinsic motivation[b]					−51.85 (81.91)	–
Extrinsic motivation[c]					−111.92 (81.97)	–
R^2	.123		.197		.395	
ΔR^2	.123*		.074*		.198*	
df	74		71		65	

* $p < .05$.
~ $p = .06$.
[a] Self-efficacy, challenge.
[b] Curiosity, involvement, importance.
[c] Recognition, grade, competition, compliance.

Chiu & Chow, 2010; Guthrie et al., 2007, 2009), with comparable effect sizes. Both Chapman and Tunmer (1995) and Guthrie et al. (2009) found a relationship with reading challenge and comprehension such that the more challenging students considered reading, the less likely they were to perform on a measure of comprehension. Chapman and Tunmer (1995) and Guthrie et al.'s (2009) findings revealed that the less challenging students perceived reading to be, the more likely it was that they would perform well on a task of comprehension. In the current study, the challenge indicator asked students to rate statements that were positively related to reading (e.g., "I like it when the questions in books make me think") such that a positive orientation, rather than a negative one, contributed to the broader construct of self-efficacy. Perhaps negative feelings toward reading are a better predictor of comprehension outcomes, as suggested by different percentages of variation explained between Guthrie et al. (2009) and the current research (i.e., 32% vs. 20%). However, more research that seeks to disentangle positive and negative attitudes toward reading is needed.

Further, because we know that reading presents an ongoing struggle for this population, the fact that self-efficacy predicted reading outcomes suggests that beliefs about oneself as a reader and willingness to commit mental resources to what will be an uphill effort with challenging texts is critical. As self-efficacy may act as a precursor to self-concept (Bong & Skaalvik, 2003), this finding aligns with previous work on self-concept and academic outcomes among students with disabilities. That is, preserving a strong view of oneself as a learner despite learning difficulties predicts more positive academic achievement (Ju, Zhang, & Katsiyannis, 2013; Rothman & Cosden, 1995; Zeleke, 2004), as does resilience in the face of disability (Margalit, 2003; Werner, 1993).

Of particular note here is the focus on students in self-contained classrooms among students with disabilities. Very little work on the role of motivation in reading has been set in such placements; however, some studies have found no differences in these motivational constructs by inclusive versus substantially separate placements (e.g., Bear, Minke, & Manning, 2002), while others have found a benefit to efficacy constructs in self-contained placements (e.g., Coleman, 1983). Considering the reciprocal relationship between academic self-efficacy and achievement in previous work (Chapman, Tunmer, & Prochnow, 2000; Ju et al., 2013), and presently, further research on the role of classroom placement in reading motivation is warranted.

4.2. Intrinsic motivation and extrinsic motivation remain elusive constructs

The finding that intrinsic and extrinsic motivation did not predict reading comprehension is consistent with previous studies with non-majority populations. Just as Guthrie et al. (2009) and Unrau and Schlackman (2006) suggest, the key elements of motivation for understudied and diverse populations appear distinct from that of majority students. The reason for these differences is not clarified by the current study, in part because typically developing populations of monolingual and ELL students were not concurrently sampled. As suggested by the MRQ items, intrinsic motivation reflects, for example, visualizing a story, becoming friends with characters, or being likely to read about topics of interest. It is possible that skilled readers are more likely to experience these aspects of reading, such that intrinsic motivation measured with these kinds of items more often reflects the experiences of majority populations, resulting in a less predictive construct in research with non-dominant populations.

4.3. Language status matters, but not for motivation

The effect of language status was a significant predictor of reading outcomes such that non-ELLs outperformed their ELL peers. Comparable achievement discrepancies have been exhaustively documented in previous research with typically-developing populations (August & Shanahan, 2006; Lesaux, 2006). However, some research comparing typically developing ELL students with their non-ELL peers has shown that reading differences generally disappear once other language and literacy variables are controlled (e.g., vocabulary knowledge, previous reading achievement; Proctor et al., 2011). Such was not the case in the current research, suggesting, perhaps, that ELL students with disabilities face challenges that supersede those of typically developing ELL children. This finding indicates a great need for continued research that seeks to understand how disability and language proficiency interact with one another. Specifically, research that explores motivation, ELLs, and the comparison of distinctive linguistic and cultural backgrounds emerges as a domain that is ripe for future inquiry.

Relatedly, the fact that self-efficacy predicted reading comprehension equally, irrespective of language status, gives rise to questions about how we operationalize motivational constructs. Currently, most literacy research shows parallel developmental trajectories for reading

outcomes such that ELLs tend to start lower than their monolingual peers and grow comparably over time, net other predictors. With respect to the construct of self-efficacy in the current study, the MRQ focuses on the degree to which students believe themselves to be good readers (efficacy) and the degree to which reading adversity is embraced (challenge; see Appendix A). These item types fail to address aspects of second language and literacy development, or other cultural dimensions inherent to reading and learning in U.S. K–12 school settings. Future investigations that operationalize self-efficacy with an eye toward the robust L2 motivational literature could make a strong contribution to understanding whether reading outcomes for ELLs may be differentially affected by self-efficacy (and other motivational) constructs that are specifically characterized by linguistic and cultural dimensions.

4.4. Limitations

There are some clear limitations to the current study. First, the students in the sample carried with them a variety of low-incidence disability labels, but the size of the sample precluded us from exploring whether and how motivation's effect on comprehension varied as a function of disability status. Surely, the discrepant nature of the students' disability categories might be hypothesized to result in different motivation profiles, and future research with special education populations ought to consider more seriously the nature and effects of motivation as it varies along these lines. Second, the use of the SRI and the READ180 formative measures as the outcome and controls in our statistical models is not ideal, and future research should replicate this study with more commonly used language and literacy instrumentation. Finally, our indicator of time spent was estimated from the students' online activities in READ180. In the participating district, READ180 classes varied in length from to 52 min to 120 min. Shorter classes ranged from 48 min to 50 min in length and generally included only some of the elements of the instructional model. Thus, not having gathered the daily time spent in READ180 across all rotations is a limitation of the current study.

5. Conclusion

The current study was unique in targeting motivation and reading comprehension among vulnerable and understudied learners in the U.S. While this was a small study, the fact that self-efficacy differentiated between stronger and weaker reading performance suggests the potential for instruction that promotes self-efficacy. This moves beyond direct instructional approaches that dominate most classroom recommendations. Indeed, the most “effective” reading intervention research with children, including ELLs, targets literacy, language, and cognitive strategy instruction (see Baker et al., 2014). Yet the findings here suggest that self-efficacy may be an important instructional dimension and as such target the development of relationships with teachers and other classmates, curiosity and self-control (Tough, 2012), feelings of “grit” (Duckworth, Peterson, Matthews, & Kelly, 2007) or “academic tenacity” (Dweck, Walton, & Cohen, 2011). These dimensions of teaching stress classroom climate above teaching strategies, and more research into these types of approaches as they relate to academic outcomes for marginalized children is merited.

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Appendix A. Overview of individual MRQ items, and related sub- and super-scales

Superscale	Subscale	MRQ items
Efficacy and challenge	Self efficacy	I know that I will do well in reading next year. (Item 7)
		I am a good reader. (Item 15)
		I learn more from reading than most students in the class. (Item 21)
	Challenge	I like it when the questions in books make me think. (Item 2)
		I like hard, challenging books. (Item 5)
		If a book is interesting I don't care how hard it is to read. (Item 8)
		I usually learn difficult things by reading. (Item 16)
		If the project is interesting, I can read difficult material. (Item 20)
Intrinsic	Curiosity	If the teacher discusses something interesting I might read more about it. (Item 4)
		I have favorite subjects that I like to read about. (Item 10)
		I enjoy reading books about different people in different countries (Item 14)
		I read to learn new information about topics that interest me. (Item 19)
		I like to read about new things. (Item 25)
		I read about my hobbies to learn more about them. (Item 29)
	Involvement	I enjoy a long, involved story or fiction book. (Item 6)
		I make pictures in my mind when I read. (Item 12)
		I read stories about fantasy and make believe. (Item 22)
		I like mysteries. (Item 30)
		I read a lot of adventure stories. (Item 33)
		I feel like I make friends with people in good books. (Item 35)
	Importance	It is very important to me to be a good reader (Item 17)
		In comparison to other activities I do, it is very important to me to be a good reader. (Item 27)
Extrinsic	Recognition	My parents often tell me what a good job I am doing in reading. (Item 18)
		I like having the teacher say I read well. (Item 28)
		My friends sometimes tell me I am a good reader. (Item 37)
		I like to get compliments for my reading (Item 43)
		I am happy when someone recognizes my reading. (Item 47)
	Grade	I read to improve my grades. (Item 3)
		Grades are a good way to see how well you are doing in reading. (Item 38)
		I look forward to finding out my reading grade. (Item 50)
		My parents ask me about my reading grade. (Item 53)
	Competition	I like being the best at reading. (Item 1)
		I try to get more answers right than my friends. (Item 9)
		I am willing to work hard to read better than my friends. (Item 41)
		It is important for me to see my name on a list of good readers. (Item 44)
		I like being the only one who knows an answer in something we read. (Item 49)
		I like to finish my reading before other students. (Item 52)
	Compliance	I read because I have to. (Item 23)
		I do as little schoolwork as possible in reading. (Item 34)
		Finishing every reading assignment is very important to me. (item 36)
		I always try to finish my reading on time. (Item 46)
		I always do my reading work exactly as the teacher wants it. (Item 51)

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