MEASUREMENT AND IMPLICATIONS OF READING MOTIVATION FOR DIVERSE SUBGROUPS OF STUDENTS

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A DISSERTATION

in

Education

Presented to the Faculties of the University of Pennsylvania

in

Partial Fulfillment of the Requirements for the

Degree of Doctor of Philosophy

2018

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DEDICATION

It takes a tremendous amount of courage to leave the only life you have ever known behind in hopes of a better life for your children. All I have ever strived to do is to make your sacrifices worthwhile and make you proud, Mom and Dad. I am forever grateful for your endless support. Thank you for risking your lives to pursue the American dream. We did it! I earned my Ph.D. in Education. But you both have a Ph.D. in life. This degree is not mine, it is ours.

Se requiere una enorme cantidad de valentía para poder dejar atrás tu vida y tu cultura con la esperanza de una vida mejor para tus hijos. Mamá y Papá todo mi esfuerzo es para hacer que tus sacrificios valgan la pena y que se sientan orgullosos de mi. Estoy eternamente agradecida por tu apoyo infinito. Gracias por haber arriesgado tu vida para perseguir el sueño americano. Lo logramos! Obtuve mi doctorado en educación. Pero, ustedes tienen un doctorado en la vida. Este titulo no es mío, es nuestro.

ACKNOWLEDGEMENTS

I would like to thank the many people who have helped me in my dissertation process. My advisor Rebecca Maynard who has provided me with countless hours of guidance, advice, and feedback. Abigail Gray who introduced me to the topic of reading motivation and supported me throughout the last two years in every capacity possible. Sharon Wolf who helped guide and improve my analysis. Cheri Vogel and Tim Kautz who served as my Mathematica summer fellowship mentors, and willingly gave up their own time to discuss ideas, refer me to resources, and guide me through my research process. Lastly, I want to thank my personal support system Mamá y Papá, Carol, Drew, Erica, Roman, and Greg.

The research reported here was supported, in part, by the Institute of Education Sciences, U.S. Department of Education, through Grant # R305A160109 to the University of Pennsylvania. The opinions expressed are those of the author and do not represent the views of the Institute or the U.S. Department of Education.

ABSTRACT

MEASUREMENT AND IMPLICATIONS OF READING MOTIVATION FOR DIVERSE SUBGROUPS OF STUDENTS

Wendy Castillo

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Prior research indicates a strong relationship between reading motivation and reading performance. However, most studies include predominately White samples, and limited research exists for young students of color. This dissertation attempts to address this gap in the research literature, and advance discussions about closing racial/ethnic and gender achievement gaps. Part one analyzes two large datasets to calculate self-reported reading motivation levels by student subgroup, and estimates predictive models to explore reading motivation's relationship to achievement. Descriptive findings show average reading motivation levels are high among all children including children from in different racial/ethnic and gender subgroups. Predictive results show that the SDQ reading subscale (third-grade reading motivation) alone explains between three and five percent of the variance in fifth-grade achievement. However, after controlling for student background characteristics, early reading motivation is not a strong predictor of later achievement, but can still enhance a teacher's understanding of how a student feels about and their perceived competence in reading. In Part two, I develop, pilot, and validate a reading motivation instrument for kindergarten students. Results indicate that it is a reliable instrument that measures two dimensions of reading motivation. However, the scale is not strongly predictive of concurrent reading achievement.

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CHAPTER 1: INTRODUCTION

Reading is a valuable academic and life skill; thus, learning to read is an important milestone in all students' educational careers (Senechal & LeFevre, 2002; Stainthrop & Hughes, 2004). Many national, state, and local reforms focus on increasing literacy performance by emphasizing the acquisition of cognitive skills, such as phonics and reading comprehension (Afflerbach & Cho, 2011). Yet, despite these efforts, 64 percent of fourth graders in the United States (U.S.) still read below proficient levels (Kena, Hussar, McFarland, de Brey, Musu-Gillette, et al., 2016). The combination of low proficiency rates and persistent racial/ethnic and gender gaps in proficiency levels have prompted serious exploration of alternative strategies for improving reading outcomes, including boosting non-cognitive skills[1] (Afflerbach & Cho, 2011). Some scholars hypothesize that improving reading motivation may be one such non-cognitive pathway to improving reading skills (Baker, Dreher, & Guthrie, 2000; Mazzoni, Gambrell, & Korkeamaki, 1999).

There is extensive literature pointing to strong positive associations between reading motivation and reading success (Baker & Wigfield, 1999; Conradi et. al., 2013; Durik, 2006; Guthrie, et al., 1999; Lau, 2009, Moller & Bonerad, 2007; Morgan and Fuchs, 2007; Park, 2011; Schiefele et al., 2012; Wang & Guthrie, 2004). This suggests three potential avenues for improving reading performance through reading motivation: (1) using reading motivation measures to identify students in need of extra assistance, (2)

[1] Non-cognitive skills are behaviors, attitudes, and strategies that facilitate success in school and the work place. Examples include motivation, perseverance, and self-control (Gutman & Schoon, 2013)

being cognizant of and/or directly consider increasing reading motivation as a potential avenue for improving reading achievement, and (3) encouraging educators to track and adjust their instructional practices to accommodate students' motivational patterns.

A motivated reader is an individual who has a desire to interact socially with text, read more, use reading strategies, and build knowledge (Guthrie et al., 2004). Theory suggests reading motivation is partly innate, but can also be fostered by an individual's environment (Brofenbrenner, 1979; Stipeck, 1996). It provides impetus for selecting and reading text. The outcomes of these behaviors reciprocally influence future motivation (Schaffner, Phillip, & Schiefele., 2016). Reading motivation is multi-dimensional, comprised of many constructs under three broad umbrellas: (1) those in form of intrinsic motivation (i.e. enjoyment, value), (2) extrinsic motivation (i.e rewards, social), and (3) those referring to the preconditions of reading (i.e. perceived competence, self-efficacy) (Schiefele, Moller, & Wigfield, 2012).

The link between reading motivation and reading achievement has not been fully explored across student groups. Specifically, prior research has not examined the heterogeneity of associations among students of different races/ethnicities and socio-economic status (SES); most studies include predominately White student samples. **Part one** of this dissertation is an exploratory study that seeks to fill this void in the research literature to advance discussions about closing racial/ethnic, SES, and gender achievement gaps by examining reading motivation's correlation to later achievement.

Contributing to the larger discipline of literacy research, **part two** of the dissertation validates a measure of reading motivation specifically for kindergarten students. Kindergarten is when children formally enter school, and given that reading

skills are associated with reading motivation, there is a need for a reliable and validated measure of reading motivation for younger students. A number of instruments have been developed to measure reading motivation, however, the majority of research on measuring reading motivation targets elementary students in second grade and above (Coddington & Guthrie 2009; Mazzoni et al., 1999).

Significance of the Problem

The reading skills students acquire in elementary school build the foundation for more advanced learning in later years (Cunha, Heckman, & Schennach, 2010). Evidence suggests that reading motivation may be a strong mediator of reading skills (Baker et al., 2000; Mazzoni et al., 1999) and that poor development of early reading skills sets children at risk of low reading achievement in general (Alvermann & Earle, 2003). Thus, it is important to explore malleable factors, like reading motivation, because they might offer guidance as to strategies that could improve children's prospects for becoming fluent readers.

In the short-term, initial reading difficulties can lead to "negative Matthew effects," which refer to frequent and intensifying negative self-beliefs and diminishing opportunities to gain skills needed for academic proficiency (Stainovich, 1986). "Matthew effects" can result in a bidirectional relationship that can have positive or negative cyclical effects on expectations, motivation, behavior, and achievement (Spear-Swerling & Sternberg, 1994).

Early reading performance is an informative predictor of future academic success. Students who are not proficient readers by third-grade are four times more likely than those who are proficient readers to drop out of high school (Hernandez, 2011). Third-

grade reading proficiency also predicts ninth grade performance and college attendance (Lesnick, George, Smithgall, & Gwynne, 2010). These findings have prompted local and nationwide campaigns, such as Read by 4th grade in Philadelphia and the nationwide Campaign for Grade-Level Reading (Gradelevelreading.net, n.d.; Readby4th.org, n.d). In response to predictive findings like these, fifteen states and Washington D.C. have enacted legislation that requires retention of students not reading on grade-level by third grade, and an additional nine states allow retention but do not require it (Weyer, 2017).

Despite awareness of the importance of early reading performance and efforts to increase it, national reading proficiency rates for fourth grade students are low and have shown little improvement in recent years. For example, fourth grade reading proficiency rates on the National Assessment of Education Progress (NAEP) only increased 7 percentage points from 29 to 36 percent between 1992 and 2015 (Mullis, Martin, Foy & Drucker., 2011; National Center of Education Statistics, 2016). Even more concerning are the racial/ethnic, SES, and gender gaps in reading skills at school-entry that persist through later elementary and secondary years. The latest NAEP data reveal that 46 percent of White fourth grade students are proficient readers compared to 18 percent of Black students and 21 percent of Hispanic students (Kena, Hussar, McFarland, de Brey, Musu-Gillette et al., 2016). Only 21 percent of students eligible for the National School Lunch Program (NSLP) read at proficient levels compared to 52 percent of students who were *not* eligible for the NSLP. Although not present at school-entry, gender gaps appear in upper elementary years: 39 percent of fourth grade girls read at proficient levels compared to 33 percent of boys (Kena et al., 2016; National Center on Education Statistics, 2012a).

Since 2007, the fourth grade racial/ethnic and gender proficiency gaps have remained relatively unchanged (Kena et al., 2016). Over the last decade, policy reforms and instructional emphasis has largely been on targeting cognitive-skills (National Center on Education Statistics, 2012a). For example, the seminal National Reading Panel (NRP) report, No Child Left Behind (NCLB), and well-known reading programs like Reading Recovery and Success for All emphasize the instruction in traditional literacy domains: alphabetics, comprehension, and fluency (Kamil, Pearson, Afflerbach & Moje, 2011).

Policy and programmatic responses.

In recent years, researchers and policymakers searching for ways to improve reading proficiency rates and race/ethnic and gender achievement gaps have shifted their attention to non-cognitive skills in search of solutions (Gutman & Schoon, 2013; West, Kraft, Finn, Martin, Duckworth, Gabrieli, & Gabrieli, 2016). Many scholars have begun to hypothesize that achievement gaps may arise due to disparities in non-cognitive skills, and these skills may be more amenable to intervention (Dee & West, 2008; Evans & Rosenbaum, 2008; Heckman & Kautz, 2013). Accordingly, the Every Student Succeeds Act (ESSA) takes a more flexible approach to literacy compared to NCLB. ESSA provides grants to states who use evidence-based literacy programs. However, the traditional cognitive literacy domains (alphabetic, comprehension, and fluency) that were emphasized for NCLB funding are not specified as requirements of ESSA grants for literacy funding (Heitin, 2016).

Similarly, developers of reading programs are now expanding their approaches to reading instruction by including strategies that aim to increase reading motivation. For example, Zoology One, a kindergarten reading curriculum, is designed to target the

traditional literacy domains while also creating a culture of reading (Institute of Education Sciences, n.d.). This culture is fostered by providing students with independent reading time, autonomy of book choice, and interesting texts with the expectation that these qualities will promote reading motivation (Institute of Education Sciences, n.d.). Another program, Concept-Oriented Reading Instruction (CORI), aims to increase reading motivation by using subject content to create goals in reading, providing hands-on reading activities, affording students' book choice, using interesting texts, and promoting collaborative instruction (Guthrie, McRae, & Klauda, 2007).

Dissertation Outline

This study uses Eccles et al.'s (1998) framework to conceptualize reading motivation. Their framework focuses on two dimensions of reading motivation (preconditions to reading and intrinsic motivation) and incorporates three theories (self-efficacy, expectancy-value, and self-determination theory) by asking two questions: (1) Can I be a good reader? and (2) Do I want to be a good reader? Two self-report Likert reading motivation scales that conceptualize reading motivation using Eccles et al.'s (1999) framework are analyzed: (1) Self-Description Questionnaire (SDQ) Reading subscale (Marsh et al., 1984) and (2) a newly developed Kindergarten Reading Motivation Scale (KRMS). Benefits and limitations of using self-report scales are acknowledged (West et al., 2016).

The literature provides strong evidence of positive associations between reading motivation and reading achievement that are influenced by environmental factors. However, there is a more limited literature examining variations in these associations across student subgroups defined by race/ethnicity and SES (Cartwright et al., 2016; Cox

& Guthrie, 2001; Durik et al., 2006; Guthrie et al., 2004; Guthrie et al., 1999; McGeown et al., 2016; Lau, 2009; Moller & Bonerad, 2007; Morgan & Fuchs, 2007; Park, 2011; Taboada, 2009; Wang & Guthrie, 2004; Wigfield & Guthrie, 1997). The literature points to instructional strategies and interventions that foster reading motivation with the expectation that reading achievement will also be increased. However, there has been limited causal research examining pathways from reading motivation to reading achievement.

Part one of the dissertation is an exploratory study that uses the Self-Description Questionnaire (SDQ) readings subscale (Marsh et al., 1984) to descriptively examine variation in third-grade reading motivation levels and fifth reading achievement levels by race/ethnicity, SES, and gender, and variation in third-grade reading motivation and fifth reading achievement levels using two different data sets. In addition, alpha reliabilities of the reading subscale are computed to verify scale reliability across subgroups defined by race/ethnicity, SES, and gender. This part of the dissertation also includes regression analyses to determine reading motivation's utility in predicting reading achievement. The descriptive and predictive analyses are first conducted using the Early Childhood Longitudinal Study Kindergarten Class of 1998-1999 (ECLS-K), a large nationally representative dataset. Then, the analyses are replicated using the Study of Instructional Improvement (SII) dataset, which includes predominately low-income Black and Hispanic students.

Part two of the dissertation is a validation study. First the development of the Kindergarten Reading Motivation Scale (KRMS) is described. Second, the scale is

validated by examining its validity and reliability using a sample of 878 kindergarten students from diverse backgrounds in Northeast Philadelphia.

CHAPTER 2: LITERATURE REVIEW

Although motivation is conceptualized using many theories, this study focuses on motivating an individual to perform a specific behavior, reading, which can be best described through a combination of three theories: self-efficacy, expectancy-value, and self-determination theory (Bandura, 1977; Eccles & Wigfield, 2002; Stipeck, 1996). Reading motivation can also be measured through a variety of methods.

This study centers on disaggregating data and examining associations by subgroup defined by race/ethnicity, SES, and gender, because limited and mixed evidence exists for the association of reading motivation and achievement for low-income Black and Hispanic students (henceforth referred to as students of color) (Jackson, 2006). Prior research on *self-report* measure of reading motivation found positive evidence for the association between intrinsic (but not extrinsic) motivation and reading comprehension (Cartwright et al., 2016; Cox & Guthrie, 2001; Durik et al., 2006; Guthrie et al., 2004; Guthrie et al., 1999; Lau, 2009; McGeown et al., 2016; Moller & Bonerad, 2007; Morgan & Fuchs, 2007; Park, 2011; Taboada, 2009; Wang & Guthrie, 2004; Wigfield & Guthrie, 1997). However, most studies have included largely White student samples.

Conceptualizing Reading Motivation

The word motivation takes root in the Latin word “movere” meaning self-directed movement (Pintrich, 2003). Theoretically, motivation is largely rationalized through, **self-efficacy, expectancy-value, self-determination, achievement-goal,** and **skills-development theory**. Specifically *reading* motivation scholars incorporate general theories on motivation and skill-specific perspectives to inform their studies of reading

motivation. This study integrates Eccles et al.'s (1998) two-question framework: Can I be a good reader? and Do I want to be a good reader?

Self-efficacy, expectancy-value, and self-determination theories focus on explaining why individuals engage in a specific activity, such as reading (Bandura, 1977; Eccles and Wigfield, 2002; Stipeck, 1996). In contrast, achievement-goal and skills-development theories focus on general motivation that is not domain-specific; thus, these theories are not used to conceptualize reading motivation in this study (Skaalvik & Hagvet, 1990). Eccles et al.'s (1998) two-question framework adds to the conceptualization of reading motivation by incorporating three theories: self-efficacy, expectancy-value, and self-determination theory. In addition, the two-question framework clearly delineates two of its most essential dimensions (precondition of reading and intrinsic motivation).

Self-efficacy theory explains behavior through an individual's cognitive understanding of his/her self-efficacy in future situations, and helps answer the question "Can I be a good reader?" (Bandura, 1977; Stipeck, 1996). Eccles and Wigfield (2002) defined self-efficacy more specifically as an individual's "ability to organize and execute a given course of action to solve a problem or accomplish a task" (p. 110). An individual's self-efficacy influences which tasks an individual will choose to engage in, how much effort an individual will be put forth, and whether an individual will persist in light of challenges (Eccles & Wigfield, 2002).

Related to self-efficacy theory, **expectancy-value theory** answers two questions "Can I be a good reader?" and "Do I want to be a good reader?" Expectancy value theory rationalizes that motivation is driven by an individual's expectation of successfully

performing a specific task in the future and his/her perceived value in performing the task (Bandura, 1977; Pajares, 1997; Wigfield & Eccles 2000). The two dimensions of reading motivation described by expectancy-value theory include (1) "expectancy" or perceived competence in the future (precondition of reading) and (2) value (intrinsic motivation), which is an intrinsic reason for engaging in reading (Wigfield, 2000).

Self-determination theory also addresses the question **"**Do I want to be a good reader?" and encapsulates the dimensions of intrinsic and extrinsic motivation (Stipeck, 1996). This theory posits that the reasons an individual chooses to engage in reading are both innate and shaped by an individual's context (Deci & Ryan, 1985). The lowest level of self-determination is external regulation, which is most similar to extrinsic motivation (Stipeck, 1996). It can be described as engaging in an activity as a means to an end, such as receiving a reward (positive) or avoiding punishment (negative) (Deci & Ryan, 1985; Stipeck, 1996). The next level of self-determination is introjected regulation, which occurs when an individual engages in an activity because of internal pressures like guilt. Finally, the highest level of self-determination is integrated regulation. Integrated regulation is the closest to intrinsic motivation (Guay et al., 2010) in that it integrates regulation and involves doing an activity "for its own sake" (Ryan and Deci, 2000). This type of regulation occurs when an individual performs an activity because it is reinforced by its alignment with his/her personal values and/or self-identity.

Measurement

Motivation typically is measured using four different types of indicators: (1) Neuropsychological, (2) phenomenological, (3) behavioral, and (4) self-report (Fulmer and Frijters, 2009). Neuropsychological indicators are based on functional Magnetic

Resonances Imaging (fMRI) scans and are uncommon in educational research because of their cost and intrusiveness (Mizuno et al., 2008). Phenomenological indicators are generated by interviewing individuals about their authentic experiences with motivation (Guthrie et al., 1996; Nolen, 2007). Behavioral indicators are derived through observations by teachers, parents, and/or researchers (Fulmer and Frijters, 2009). Finally, self-report indicators are the most commonly used approach to measuring motivation in education research and practice (Schiefele et al., 2012).

This study uses self-report indicators that are combined to form Likert scales to generate measures of reading motivation. In this way, it was possible to assess a large number of students, recognizing the inherent limitations of self-report measurement tools. Likert scales based on self-reports by students are vulnerable to three types of bias: Self-assessment, social desirability, and reference bias (West et al., 2016). These bias can occur because a student is unrealistic about his/her abilities, ignores information, and/or has lacks information about his/her abilities (Dunning, Heath, & Suls, 2004). Social desirability bias occurs when a student responds to an item in a manner that s/he believes will please others (Paulhus, 2002). If all students respond with higher ratings, social desirability bias can shift the distribution. However, if only some students respond with higher ratings, then social desirability bias can change students' rank-order in the distribution.

Self-report scales are also vulnerable to reference bias, which is the idea that students respond in reference to their classmates, school, peer group, family, and/or community (West et al., 2016). For example, one among many potential sources of reference bias is differences in the characteristics of the schools that high Socioeconomic

Status (SES) students and low SES students attend (Reardon, Valentino, Kalogrides, Shores & Greenberg, 2013; West et al., 2016). High SES students are more likely to attend high-quality schools (Reardon et al., 2013) and, as a result, students from varying SES groups will experience different points of reference for gauging what it means to "have a lot of books" or "read hard words."

Self-report scales also have advantages over other types of measures of self-motivation. For large scale studies, researchers can quickly, easily, and cheaply administer self-report scales to thousands of students (West et al., 2016). If students can read, self-report scales are a relatively low burden for teachers because they can be administered in whole-group settings. Additionally, given the feasibility of administration, they can also be used easily by practitioners. Finally, self-report scales can be tailored to ask questions about specific skills, while an observation tool can capture only what the researcher observed at one point in time (West et al., 2016).

An extensive search of the literature identified 18 existing scales/instruments to measure reading motivation of elementary-aged school children (summarized in Table 1). However, few of these scales were designed for use with kindergarten students (or younger). Eight scales were created for upper elementary students, 5 were for lower elementary students, and 5 were for pre-kindergarten or kindergarten students. Table A.1 in Appendix A provides a more detailed list of all scales identified (majority self-report), including author-reported measures of reliability and validity.

Table 1. Scales that Measure Reading Motivation in Elementary School Students

Instrument and (Author)	Sample
Access to books, Beliefs, and Literacy Environment (ABLE) (Stack, Moorefield-Lang, & Barksdale, 2015)	145 students in grades 2nd-5th at 1 urban elementary school; majority Black
Book Reading Motivation Scale (Katranci, 2015)	579 4th-6th grade students in Turkey
Children's Academic Intrinsic Motivation Inventory (Gottfried, 1985)	141 White middle-class children in 4th-7th grade and 260 Black students
Children's Motivation for Reading Scale (MRS) (Baker & Scher, 2002)	65 1st graders from 6 Baltimore Public Schools
Early Literacy Motivation Survey (ELMS) (Wilson & Tranin, 2007)	198 1st grade students in a large district in CA; 47% White, 42% Hispanic, and 7% Black
Elementary Reading Attitude Scale (ERAS) (McKenna & Kear, 1990)	Administered to nationally rep. sample ~18,000 children in grades 1st-6th
Emergent Readers Motivation and Reading Scale (ERMAS) (Sperling, Sherwood, & Hood, 2013)	Small city; 16 preschool students and 41 kindergarten students
Emergent Reading Motivation Scale (ERMS) (Zheng, Schwanenflu, & Rogers, 2016)	56 preschool children from Northeast Urban Georgia; 80% White
Literacy Attitude Scale (LAS) (Ozturk, Hill, & Yates, 2016)	94 (5 year olds) from four schools in Australia
Me and My Reading Profile (Marinak, Malloy, Gambrell, & Mazzoni, 2015)	899 K-2nd grade students in 3 east coast states

Motivation for Reading and Writing Profile (MRWP) (Mata, 2011)	451 kindergartners in Portugal
Motivation for Reading Questionnaire (MRQ) (Wigfield, 1996)	Widely used in numerous studies
Motivation to Read Profile- Revised (MRP-R) (Malloy, Marinak, Gambrell, & Mazzoni, 2013)	In three east coast states; 118 3rd graders, 104 4th graders, and 54 5th graders
Preschool Reading Attitude Scale (PRAS) (Saracho, 1988)	2201 children from TX, CA, PA, MD, & VA; 3, 4, and 5 year olds
Reading Motivation Questionnaire (RMQ) (Schiefele & Schaffner, 2016)	883 6th grade students in Germany
Reading Self-Concept Scale (RSCS) (Chapman & Tunmer, 1995)	Over 1,000 children from large New Zealand provincial city; 5, 6, and 7 year olds
Young Children's Academic Intrinsic Motivation Inventory (Gottfried, 1988)	107 children ages 7-9; mostly White students
Young Reader Motivation Questionnaire (YRMQ) (Guthrie & Coddington, 2009)	84 students, all but 3 were White 1st graders

Most scales measured reading motivation for a narrowly defined population (e.g. White suburban students, Portuguese students, or Turkish students). Some scales, like the Elementary Reading Attitude Scale (ERAS) (McKenna and Kear, 1990) and the Pre-school Reading and Attitudes Scale (PRAS) (Saracho, 1988), measured only one dimension of reading motivation− reading attitude (intrinsic motivation). Distinct from other scales, both the ERAS and PRAS were administered to diverse and large student

samples, yielded reliable Cronbach alphas, and were correlated with reading achievement measures. Other scales that attempt to more fully capture the multi-dimensional nature of reading motives were developed for older students.

Reading Motivation and Reading Achievement

The literature examining the association between self-report reading motivation and achievement contains limited empirical analysis. Furthermore, what empirical analysis there is tends tend to be descriptive and correlational; multivariate analysis, time trends, and predictive pathways are rare (Conradi et. al., 2013; Morgan and Fuchs, 2007; Schiefele et al., 2012; Fives, 2016). Moreover, most prior research focuses on White students in grades 3 through 5 and they most commonly used the self-reported Motivation Reading Questionnaire (MRQ) to measure reading motivation.

Generally, the research has found that elementary students who had higher scores on self-reported intrinsic motivation reported spending an average of three times more minutes reading (about 30 compared to about 10 minutes) than did students who scored low on dimensions of intrinsic motivation (Wigfield & Guthrie, 1997). Prior research has *not* identified a clear correlation between extrinsic motivation and reading comprehension (Baker & Wigfield, 1999; Durik, 2006; Guthrie, et al., 1999; Lau, 2009, Moller & Bonerad, 2007; Park, 2011; Wang & Guthrie, 2004).

Most of the above mentioned studies were conducted years ago when schools had lower representations of Black and Hispanic students and include predominately White samples. The few existing studies that did include Black and Hispanic students found divergent results between Whites and Blacks, with White fifth-grade students having higher average intrinsic motivation and achievement than do their Black student

counterparts and vice versa (Baker & Wigfield, 1999; Guthrie et al., 2009). Unrau and Schlackman (2006) conducted path analysis and found a positive statistically significant association (standardized β=.55) between intrinsic motivation and reading competence for Asian students (24 percent of the sample), but not for Hispanic students (76 percent of the sample). Furthermore, the aforementioned research suggests that the association between reading motivation and comprehension may be moderated by race/ethnicity and gender (McGeown et al., 2016; Park, 2011; Taboada, 2009; Wang and Guthrie, 2004).

Reading Motivation Levels by Subgroups

This study focuses on disaggregating data because prior research indicates that, as for reading achievement, we may expect there to be differences in reading motivation associated with age, race/ethnicity, and gender (Baker & Scher, 2002; Baker & Wigfield, 1999; Graham, 1994; McKenna et al., 1995; Saracho & Dayton, 1989). These differences likely arise because motivation is a theoretical construct that operates differently depending on environmental contexts (Fulmer & Frijters, 2009). Table 2 provides a summary of the key findings of the prior literature related to subgroups of interests to the current studies. As noted below, some differences appear to be larger and more consistent than others.

Table 2. Summary of Reported levels of Motivation to Read by Subgroup

Focal Characteristic	Key Findings From the Literature
Age	Motivation tends to decline with age. The "decrease in motivation" as children get older could be a result of normal maturation, measurement issues, or socialization. The manifestation of motivation changes over time, as does the way you measure it. (Baker et al., 1997; Eccles, 2005; Lepper et al., 2005; Mazzoni et al., 1999; Sperling & Head, 2002).
Race/ Ethnicity	Research indicates that differences in motivation may exist by race, however, results are inconsistent (Baker & Scher, 2002; Baker & Wigfield, 1999; Graham, 1994; McKenna et al., 1995; Saracho & Dayton, 1989)
Gender	Girls generally self-report higher levels of reading motivation than so boys (Applegate & Applegate, 2010; Baker & Wigfield, 1999; Eccles et al., 1993; Jacobs et al., 2002; Marinak & Gambrell, 2010; Pinrich et al., 2007).

Reading motivation and age.

The majority of the literature on motivation to read suggests that young children enter school with curiosity for learning and high levels of motivation (Harter & Pike, 1984; Mazzoni et al., 1999; Baker et al., 1997; Sperling & Head, 2002; Stipek & Ryan, 1997). Existing research that tracked students' reading motivation found that levels of reading motivation remained stable during the early grades (PK-2) (Mazzoni, Gambrell, & Korkeamaki, 1999; Sperling & Head, 2002). One explanation of this phenomenon is that young children, particularly preschool-age children, have not yet developed the capacity to understand their competence and/or make social comparisons (Harter, 1990; Mata, 2011; Wigfield, 2000). Furthermore, Wigfield (2000) noted that young children experience literacy in a positive and low-stakes environment (i.e. storybook read a-louds,

singing), but as children get older some begin to realize that they are not as capable as their peers and, as a result, their motivation to read decreases. Gambrell and Gillis (2007) posited another explanation similar to Wigfield's (2000), asserting that young children have not encountered failure or frustration and, thus, those with more challenges to reading and/or lower abilities may have inflated motivation levels.

Reading motivation and race/ethnicity.

Mixed results exist for motivation levels by race/ethnicity for elementary students. In some studies, young Black students self-reported higher average levels of reading motivation than do their White peers (Baker & Wigfield, 1999; McKenna et al., 1995), while other studies found no difference between the groups (Baker & Scher, 2002) or contrasting results (i.e. White students report higher levels than Black students) (Saracho & Dayton, 1989). Evidence comparing motivation levels between White and Hispanic students is more limited. However, Barry (2013) found that adolescent Hispanic males reported the lowest overall average motivation levels.

Reading motivation and gender.

There is an abundance of research on the difference in motivation to read between elementary school boys and girls. On average, young girls have higher levels of self-reported reading motivation than do their male counterparts (Applegate & Applegate, 2010; Jacobs et al., 2002; Eccles et al., 1993; Marinak & Gambrell, 2010; Pinrich et al., 2007; Wigfield & Guthrie, 1997). It has been posited that these gender differences are a result of students' internalization of stereotypes (i.e. girls have positive attitudes toward reading and less positive attitudes toward science than do boys) (McKenna et al., 1995).

Environmental Influences on Reading Motivation

Although self-determination theory rationalizes reading motivation as partly innate, these theories also acknowledge the environmental influences on reading motivation (Deci & Ryan, 1985). Family and school literacy environments are the most proximal and likely most influential environments in a students' development of reading motivation (Bronfenbrenner, 1979).

Reading motivation and home literacy environment.

There is a rich literature pointing to strong relationships between family background and qualities of the home literacy environment and student's reading skills (Leslie & Allen, 1999; Molfese et al., 2003; Samuelsson & Lundberg, 2003). There is a smaller literature suggesting that parental actions and expectations are predictive of students' motivation to read (Bracken & Fischel, 2008; Martini & Senechal, 2012)− a finding that is consistent with the reasoning of Bus and van Uzendoorn (1995) that: ". . . interest in reading is not a natural phenomenon but rather . . . . Children become interested in reading books because of parental efforts to evoke and support interest" (p.998). McElvany and Artlet (2007) assert that the home environment is a place for the development of reading motivation by establishing a strong tradition of positive reading behavior within families, offering children resources (i.e. books) at home and by providing cultural activities among other opportunities. Snow et al. (1998) explain that parents with higher educational levels may expect their children to be successful at school; thus, they tend to pay more attention to their children's academic performance.

Reading motivation and classroom influences.

Teachers create a learning environment within their classrooms (Hickey, 2003) that is associated with increasing their students' motivations because it builds on students' initial levels of motivation '(Ryan & Patrick, 2001). Prior research has found particular instructional strategies create positive learning environments and, as a result, increase student motivation. These strategies include those incorporated by the aforementioned Zoology One and CORI programs, which provide independent reading time, autonomy of book choice, interesting texts, subject content, hands-on reading activities, and collaborative instruction (Institute of Education Science, n.d.; Guthrie et al., 2007). Other strategies include providing students with appropriately challenging material, evaluating students in a manner that promotes growth and improvement, providing structure around mastering knowledge and learning goals, serving as an explicit reading model, providing a book-rich classroom, exposing students to diverse texts, and offering appropriate reading incentives (Gambrell, 1996; Urdan & Schoenfelder, 2006; Wu, 2003).

Instructional Implications

Measuring, tracking, increasing, and sustaining motivation to read can potentially transform classroom instruction and strengthen student outcomes. Research and theory have shown that, although students generally begin school with high levels of curiosity, as they progress in school, their motivation and self-efficacy tends to decrease (Wigfield, 2000). Thus, teachers are faced with a difficult challenge of attempting to sustain and increase students' motivation. Using motivation instruments in formative assessments

potentially could trigger teaching practices that would raise motivation among students who are not reading at grade-level and have low reading motivation.

There is a very limited evidence base pointing to interventions that have promise for increasing and/or sustaining reading motivation. Table 3 provides a list of instructional interventions that have some evidence (correlational or causal) suggesting that they may improve reading motivation (and achievement). Of the eight interventions identified, three focus on lower elementary students (Literacy Lift-Off, pair-reading, and Reading Recovery), and five focus on upper elementary students (two interventions on combinations of instructional strategies, CORI, personalization of online text, and supplemental reading instruction). The estimated magnitudes of the improvements in reading motivation and/or achievement range from .09 (Literacy Lift-Off; Higgins et al., 2015) to .80 standard deviations (combination of reading strategies; Marinak, 2013).

Table 3. Instructional Interventions that May Improve Reading Motivation

Intervention	Description	Evidence and Estimated Impact
Combination of Instructional Strategies	(1) During self-selected reading time students selected a book-club to join a topic/genre of their choice (2) students select books for the teacher read-aloud (3) students divide a book into sections (jigsaw) and each student is responsible for becoming an expert on her section	In a quasi-experimental design study, students who were in classrooms with teacher who used the three instructional strategies scored higher on the Motivation Reading Profile (MRP) by .80 standard deviations (Marinak, 2013).
Combination of Instructional Strategies	(1) Offering encouragement (2) providing clear instructions (3) offering positive feedback (4) getting along with students (5) providing challenging and fun activities (6) group work	In a quasi-experimental design, scores on four sub-dimensions of reading motivation (as measured by Motivation to Read Questionaire (MRQ)) increased, however, the magnitude of the estimated impact was not reported (Varuzza et al., 2014).
Concept-Oriented Reading Instruction (CORI)	(1) Use content goals in reading instruction (2) provide hands-on activities (3) afford students choice (4) use interesting texts (5) promote collaboration in reading instruction	Correlational evidence reveals that students who participated in CORI self-reported higher motivation, use reading strategies more often, and score higher on reading comprehension exams. The study did not report the magnitude of estimated impacts (Guthrie, McRae & Klauda., 2007).

Literacy Lift-Off (LLO)	Classroom and special education teachers collaborate to work with students in groups of 4 or 5 for 10-minute rotating sessions on a range of literacy activities that mirror Reading Recovery lessons	Using a randomized controlled design, students in the treatment group improved more on literacy skills (.34 standard deviations) and self-reported higher reading self-concept beliefs (.09 standard deviations) (Higgins, Fitzgerald, & Howard, 2015).
Pair- Reading Program	(1) Simultaneous reading (2) reading alone (3) text comprehension	Using a quasi-experimental design, scores on motivation questionnaire increased both for the tutee group (2^{nd} graders) and the tutors (4^{th} graders); the estimated impact was not reported (Montiero, 2013).
Personalization of Online Texts	Prior to reading online texts, each student completes a personal interest inventory for use in personalizing the online texts	Using a randomized controlled design, results indicated that treatment students scored higher on the attitude questionnaire, but not in reading comprehension; the estimated impact was not reported (Ertem, 2013).
Reading Recovery	1^{st} grade students meet with a specially trained teacher for 30 minutes of individualized instruction each day for a period of 12–20 weeks	Using a quasi-experimental design and structural equation modeling, the authors estimated an increase of .65 standard deviations on achievement and .54 standard deviations on motivation after controlling for previous achievement and motivation (Bates et al., 2016).

Supplemental Reading Instruction	Students reading two grades levels below their actual grade level were assigned to a minimum of 250 minutes per week of supplemental reading instruction taught by a learning strategies curriculum teacher.	Using a randomized controlled design, students who participated in the intervention had higher reading motivation (.16 standard deviations) and reading achievement scores (.08 standard deviations higher) (Cantrell et al., 2016).

Discussion

Teacher, researchers, and other stakeholders can benefit from more validated scales of reading motivation for young students to use for summative and/or formative purposes. Although correlational research indicates that increasing reading motivation is associated with increased reading achievement, more rigorous research is needed to further understand whether this association is generalizable to student subgroups defined by race/ethnicity, SES, and gender. The next step is to examine associations overtime while controlling for variables that are related to student performance. Researchers should also simultaneously measure and track reading motivation, amount of reading students do, reading strategies being used, and reading comprehension to further understand the linkages and causal paths between them.

Strong measures of reading motivation, such as the MRQ and Motivation to Read Profile (MRP), exist for older students, yet only one reliable and valid scale for emerging readers was identified (Me and My Reading Profile, Marinak et al., 2015). Although Marinak et al. (2015) used factor analysis to validate Me and My Reading Profile, they did not further validate their instrument by examining its association between scale scores and measure of reading performance. This is particularly important because

accountability for learning how to read begins in kindergarten (Bowdon, 2015). As a result, it is not enough to increase motivation without also increasing achievement. More research is needed in the form of development and/or continued validation of instruments that are age and skill appropriate (e.g. developing instruments that work with students who may or may not be able to read). Response codes and administration methods must also be appropriate to for the ages and skills of the respondents to obtain valid and varied responses

Preliminary research has shown differences by race/ethnicity and gender in the correlations between motivation and achievement. It would be valuable to confirm this general finding using data for a large nationally-representative sample. For example, if students from lower and higher socio-economic status (SES) backgrounds have similar motivation levels but disparate achievement outcomes, this would cast doubt on the hypothesis that motivation is the source of the reading achievement gaps. More likely explanations might be that low SES students lack access to reading resources, high-quality schools, and/or effective teachers. Alternatively, it may be possible that current measurement tools are valid for some, but not all groups of students (e.g., they may be valid for higher income nonminority students, but not for low-income and minority students). For this reason, it is useful to focus on developing and/or identifying existing measures of reading motivation and other non-cognitive skills that are valid across the various population groups of young children.

In addition to tracking students over time, using causal methods to understand which interventions and reading strategies have the highest impact on reading motivation and achievement also would be valuable for educators and for policymakers. However,

the majority of studies reviewed did not study motivation within an intervention context (Fives, 2016; McElvany et al., 2008; Schiefele et al., 2012).

CHAPTER 3: PART 1. AN EXPLORATIORY ANLAYSIS OF THE CORRELATION BETWEEN READING MOTIVATION AND READING ACHIEVEMENT

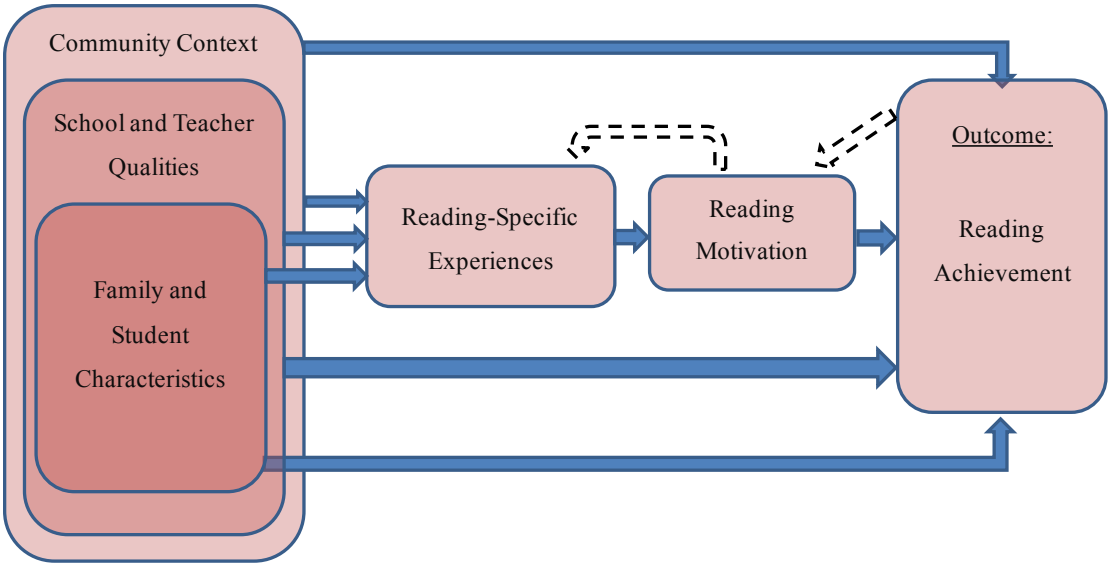
Given the mixed and limited findings related to reading motivation for students of color, this exploratory study attempts to examine how longitudinal student-level data at various grade levels can be used to improve our understanding of reading motivation processes and the impacts of reading motivation on reading achievement. This study uses three theoretical frameworks to guide exploratory analyses using two different longitudinal data sets. The three theories are Bronfenbrenner's ecological systems theory (Bronfenbrenner, 1979), self-determination theory (Deci & Ryan, 1985), and the model of skill formation (Cunha & Heckman, 2008).

Bronfenbrenner's ecological systems theory posits that students exist within systems with which they interact. This study focuses on students and their interactions with microsystem consisting of school and family.[2] Self-determination theory and the model of skill formation suggest that, although motivation is partly innate, it can be shaped and strengthened like a skill through a student's microsystem (family and school contexts). Under this reasoning, a student interacts with his/her family and school context to create reading-specific experiences. These experiences may occur in both educational and non-educational settings. Some examples of reading-specific experiences include going to a museum, visiting a school library, and/or having access to books at home. Formed both by an individual's innate motivation and contextual environment, these reading-specific experiences influence reading motivation and thereby reading

[2] The other systems include the exosystem and macrosystem, which comprise of the local community and the culture at-large, respectively (Bronfenbrenner, 1979).

achievement. Figure 1 below shows how these microsystems may influence the reading motivation process.

Figure 1. Theory of Change: Reading Motivation Processes



The study centers on using Marsh et al.'s (1984) Self-Description Questionnaire (SDQ) reading subscale to explore student self-reports of reading motivation and their association with reading achievement. Marsh et al.'s (1984) created the SDQ, which is composed of many subscales. The reading subscale attempts to measure two of the subdomains that this study uses to conceptualize reading motivation: perceived competence (answers the question, "Can I be a good reader?") and interest (answers the question, "Do I want to be a good reader?").

Research Questions

This study examines descriptive and predictive research questions related to the SDQ scale using two different datasets. The descriptive questions are intended to increase our understanding of the statistical properties of both the independent and dependent variables in the predictive analysis. They also include questions about whether and, if so,

how the properties of the variables and their predictive relationships vary across subgroups defined by race/ethnicity, SES, and gender. The descriptive questions are as follows:

- What is the reliability of the Self-Description Questionnaire (SDQ) reading subscale for the study samples?
- What are the distributions of the SDQ reading subscale measure among third graders in the study samples?
- What are the levels of reading achievement among fifth graders in the study samples?

The predictive questions include the following:

- What is the predictive power of the SDQ-reading subscale (third-grade reading motivation) on reading achievement?
    - How much of the correlation between SDQ-reading subscale (third-grade reading motivation and fifth-grade reading scores remains after controlling for student background, home, and classroom characteristics?

Data

This study begins by exploring the descriptive and predictive questions related to the SDQ reading subscale using the Early Childhood Longitudinal Study Kindergarten Class of 1998-99 (ECLS-K) dataset. To add credence to the study and allow a closer examination of the correlation of reading motivation and achievement specifically for SES students of color, the same analyses are replicated as closely as possible using the Study of Instructional Improvement (SII) dataset.

The measures, grade range for the study sample and time frames for the two

datasets, are sufficiently similar to support replication of ECLS-K analysis with the SII dataset. ECLS-K and SII have the following identical variables: SDQ reading subscale, socio-economic status (SES), gender, race/ethnicity, age, frequency read to child, and number of books in the home. However, SII uses a different reading achievement measure than ECLS-K and does not link classroom characteristics to students; aside from the sample frame, these are the main the divergences between the two datasets.

Table 4 below displays demographic characteristics for kindergarten students in both datasets. SII contains a higher representation of girls than ECLS-K, (54 percent compared to 46 percent). As expected SII has a higher percent of Black students and lower percent of White students than ECLS-K, however, both datasets have a similar percentage of Hispanic students. As expected ECLS-K has a more students in the top two income quintiles than SII because ECLS-K is a nationally represented dataset and SII is not. Similarly, SII has a larger proportion of students' families who receive public assistance.

Table 4. Demographics Characteristics of Kindergarten Students in the Early Childhood Longitudinal Study- Kindergarten (ECLS-K) and Study of Instructional Improvement (SII) Datasets

Demographics	ECLS-K	SII
Gender:		
Girls	49.99%	**53.51%**
Boys	50.01%	46.49%
Race/Ethnicity:		
White	**59.62%**	**23.92%**
Black	**10.39%**	**48.33%**
Hispanic	18.22%	18.50%
Other	11.7%	9.25%
SES (Income Quintile):		
1st (bottom)	15.82%	**32.70%**
2nd	18.26%	**22.26%**
3rd	19.03%	**31.22%**
4th	22.34%	11.41%
5th (top)	24.54%	2.31%
Public Assistance (Food Stamps)	9.42%	**25.52%**
	n=10,168	n=1,254

Note: These are characteristics of the sample used in this study, not of the entire sample of the ECLS-K and SII datasets. Data were collected during year one of the survey sample data collection; ECLS-K in 1998 and SII in 2000.

Early Childhood Longitudinal Study – Kindergarten (ECLS-K).

ECLS-K is a large nationally representative dataset of U.S. kindergarteners in the 1998-99 school year that follows the same cohort of students from kindergarten through eighth grade collecting student, parent, teacher, and school data. This is an ideal dataset for this study because it includes a self-description reading scale that was administered to all third-grade students. Although, at the time of data collection (1998-99) the proportion

of U.S. students who were Black and Hispanic was lower than it is today, there are almost 2,000 Black and Hispanic students in the study sample (28 percent).

The ECLS-K data are not necessarily generalizable to the U.S. student population today. Moreover, although the original ECLS-K sample was representative of the national population of kindergartners in public schools in the fall of 1998, the analytic sample for this study is no longer representative of that original sample due to out- and in-migration to those schools (Tourangeau, Nord, Pollack & Atkins-Burnett, 2006).

ECLS-K used a complex, multi-stage probability sample design to create a nationally representative sample. The primary sampling units (PSUs) were geographic areas that consist of counties. The second-stage sampling units were schools within these PSUs and, in the final stage, sampling units were students within the sampled schools. Longitudinal weights were used to account for the attrition of base-year recipients due to moving to a new school/district/state/country, death, non-response, or unknown reasons (Tourangeau, Nord, Pollack & Atkins-Burnett, 2006).

This study uses the Taylor series weight as recommended by ECLS-K developers to calculate standard errors that account for clustering, multi-stage sampling, and the use of differential sampling rates for specific subgroups (Tourangeau et al., 2006). The Taylor series method takes into account the first-stage stratum (PSU) to produce a linear estimate. Then the variance is calculated using standard variance formulas (Tourangeau et al., 2006, p. 4-47). In a non-survey context, this estimator is referred to as the linearized variance estimator or Huber/White/sandwich estimator (StataCorp, 2013).

Study of Instructional Improvement (SII).

The SII surveyed students in 120 schools annually from 2000 through 2004 for

the main purpose of evaluating three whole-school reforms of instructional improvement strategies. The schools in the study sample included a group of schools implementing the reforms and a set of matched comparison schools. Thus, the students in the study sample are representative of students in the study schools, not of students in U.S. public schools. In fact, the study sample is disproportionately (67 percent) low-income and includes large proportions of Black and Hispanic students. Students from both the treatment and comparison schools are included in the analysis.

The SII sampled students in four stages (Atkins-Burnett, Rowan, & Correnti, 2001). First, researchers created a list of all public elementary schools that had an affiliation with one of the three whole school reforms being studied. Second, to contain data collection, 17 geographic areas with large concentrations of schools implementing one of the three reforms were identified. Third, equal numbers of schools implementing each reform were selected based on (1) the length of time the school had been affiliated with the reform and (2) the number of enrolled low SES students. In the final stage, comparison schools were chosen based on similar geographic location and school demographics. Thus, schools that serve high proportions of low SES students were overrepresented (Atkins-Burnett, Rowan, & Correnti, 2001). Students were clustered within schools and within classrooms. A robust cluster standard error is used in this study to account for clustering and heteroskedasticity (Froot, 1989; Rogers, 1993; Wooldridge, 2002; Williams, 2000).

Variable Selection

The dependent variable in the analysis is fifth-grade reading achievement. The ECLS-K reading achievement test was adapted from National Assessment of Educational

Progress (NAEP) and administered in three adaptive stages. The tests include key reading concepts, such as high-frequency word identification, vocabulary, and comprehension. I elected to use the reading Item-Response Theory (IRT) [3] score as it provides an "apples to apples" comparison of students' scores, across true achievement levels (Nering & Ostini, 2011). Cronbach's alpha reliability of the IRT score is α =.93 (Tourangeau, Nord, Pollack & Atkins-Burnett, 2006).

Reading achievement in SII, like in ECLS-K, was measured in adaptive stages using the TerraNova standardized reading exam, which assesses key concepts, such as vocabulary, text analysis, evaluating meaning, and reading strategies (Atkins-Burnett, Rowan, & Correnti, 2001). TerraNova's reliability was assessed using Kuder-Richardson (KR20 = .83) (McGraw Hill, 1997), which under ideal circumstances with no missing data should produce similar results to Cronbach's alpha (Allen & Yen, 2001).

Reading motivation and all covariates, with exception to race/ethnicity, gender and age, are measured in third grade and standardized (z-scores: Mean of 0, and standard deviation of 1) to allow an across dataset comparison of coefficient magnitudes. Covariate selection was based on this study's theory of change with attention to those variables that contribute to reading-specific experiences; it is also limited by the variables in the existing datasets.

Reading motivation is measured using the SDQ reading subscale. It consists of eight items that students respond to on a four-point Likert scale. Table 5 below displays the items. Student responses range from "1 = not at all true" to "4 = very true." The scale

[3] IRT uses a pattern of right and wrong answers to adjust scores for students who did not complete all three stages (Nering & Ostini, 2011).

is a minimally burdensome for students and teachers because administration time is about one minute and it can be administered in a whole-group setting.

Table 5. Self-Description Questionnaire (SDQ)- Reading Subscale Items

a. I get good grades in reading
b. I like reading
c. Work in reading is easy for me
d. I am interested in reading
e. I cannot wait to read each day*
f. I am good at reading
g. I like reading long chapter books*
h. I enjoy doing work in reading

*Items omitted from this analysis because they were included in the ECLS-K survey, but not in the SII survey.[4]

SII administered six of the eight items of the SDQ reading subscale to its students. The items "I like to read long chapter books" and "I look forward to reading" were omitted without explanation from the authors (Atkins-Burnett, Rowan, & Correnti, 2001). Thus, to ensure an "apples to apples" comparison, only the six items that were administered in both datasets are used for this analysis.

The reliability coefficient for the third-grade SDQ reading subscale reported by the authors during validation was $\boldsymbol{\alpha}$ =.74 (Marsh et al., 1984). However, for the third-grade students in the ECLS-K data, the reliability alpha reported by ECLS-K designers

[4] Analyses were completed both with all 8 items and only with 6 items, there were no differences in coefficient sizes or statistical significance.

was higher, with **α** =.87. (Tourangeau, Nord, Pollack & Atkins-Burnett, 2006). Finally, the reading motivation score is calculated by taking a simple average of responses to all six items.

Third-grade reading achievement is used as a covariate because previous achievement is also a strong predictor of future achievement (Hemmings, Grootenboer, & Kay, 2011). This variable uses IRT and the same adaptive technique as the fifth-grade reading achievement variable. Cronbach alpha for ECLS-K is **α** = .93. Kuder-Richardson reliability coefficient for SII is considerably lower at KR20 = .79. To examine the likelihood of potential multi-collinearity, the Pearson product correlation between third-grade reading achievement and third-grade motivation is calculated; the correlation is low for both ECLS-K (r = .22) and low for SII (r = .24).

Age is measured as a categorical variable in months. It is controlled because younger students self-report higher reading motivation than older students (Baker & Wigfield, 1999; Wigfield & Guthrie, 1997; Jacobs et. al, 2002).

Race/ethnicity and **gender** are included as covariates because of the racial/ethnic and gender achievement gaps that exist. Additionally, prior literature suggests race/ethnicity and gender may moderate the correlation between reading motivation and achievement (Baker & Wigfield, 1999; Kena et al., 2016; Unrau & Schlackman, 2006). A categorical variable is used: non-Hispanic White, Black, Hispanic, and "Other." "Other" includes all other races/ethnicities including Asian, Pacific Islander, Native American, and those who did not report.

Socioeconomic Status (SES) is controlled because low SES is a risk factor for academic performance (Sirin, 2005). SES is a *composite* continuous variable that was

created by the developers of the ECLS-K data. It is based on parents' self-reported income, family size, parental education, and occupation (Tourangeau, Nord, Pollack & Atkins-Burnett, 2006). SII authors also developed a composite SES score using the same procedures as ECLS-K, however in SII, the composite score is not norm referenced (Atkins-Burnett, Rowan, & Correnti, 2001).

Home literacy environment and student reading skills are strongly related (Leslie & Allen, 1999; Molfese et al., 2003; Samuelsson & Lundberg, 2003). There are two covariates common to both datasets that provide measures of home environment specific to the literacy-specific opportunities and experiences provided to children: (1) number of books in the home and (2) frequency of reading to the child. Table B.1 in Appendix B provides summary statistics for the home literacy variables in each dataset.

Classroom characteristics can influence achievement (Hoxby, 2000; Taylor, Pressley, & Pearson, 2002; Urdan & Schoenfelder, 2006; Wayne & Youngs, 2003). Classroom characteristics were not linked to student data in the SII study. However, the ECLS-K data includes two clusters of classroom covariates: (1) measures of peer characteristics and (2) measures of teacher/instructional characteristics. Peer effects measures include class size, percent of students reading below grade level, percent minority, and percent English Language Learners (ELL). Teacher/instructional characteristics measures include years of teaching experience, frequency of mixed ability grouping, frequency of ability grouping, time spent on reading in class, and frequency of reading projects. Table B.2 in Appendix B provides summary statistics for the classroom variables in ECLS-K.

Methodology/Analysis

Descriptive analysis.

First, reliability scores were checked across student subgroups to ensure internal consistency of the reading motivation scale. Overall Cronbach's alpha was calculated for each subgroup from the pairwise correlations between items using the following formula (Knapp, 1991):

$$\alpha = \frac{N\ (Mean\ r)}{1 + Mean\ r\ (N - 1)}$$

α = Cronbach Alpha

N = the number of items

Mean *r* = mean inter-item correlation

The following common rule of thumb was used (George and Mallery, 2003): above .9 (excellent), between .8-.9 (good), .7-.8 (acceptable), .6-.7 (questionable), .5-.6 poor, and below .5 (unacceptable).

Means and standard deviations were reported for self-reported reading levels broken down by subgroups defined by race/ethnic background, SES, and gender. Mean scores were calculated by taking the simple average of responses to the six items, which range from one to four.

Since the two datasets used different reading achievement tests, mean fifth-grade reading achievement scores were standardized (z-score; mean: 0; and standard deviation: 1) to facilitate comparisons across datasets; all other variables are similar.

Predictive models.

The following models were run using Ordinary Least Squares (OLS) regression. The first model examined the ability of the SDQ-reading subscale (third-grade reading

motivation) to predict fifth-grade reading achievement, without any control variables.

$$(1)\ Y_{5thACHV} = \beta_0 + \beta X_{3rdMOTIV} + \varepsilon$$

The second model explored the ability of the SDQ-reading subscale (third-grade reading motivation) to predict fifth-grade reading achievement, controlling for student background characteristics:

$$(2)\ Y_{5thACHV} = \beta_0 + \beta X_{3rdMOTIV} + \beta X_{3rdACHV} + \beta X_{SES} + \beta X_{Age} + \beta X_{Race} + + \beta X_{Gender} + \varepsilon$$

The third model explored the ability of the SDQ-reading subscale (third-grade reading motivation) to predict fifth-grade reaching achievement, controlling for student background *and* home literacy environment characteristics:

$$(3)\ Y_{5thACHV} = \beta_0 + \beta X_{3rdMOTIV} + \beta X_{3rdACHV} + \beta X_{SES} + \beta X_{Age} + \beta X_{Race} + + \beta X_{Gender} + \beta X_{\#ofBooks} + \beta X_{ReadtoChild} + \varepsilon$$

The fourth model explored the ability of SDQ-reading subscale (third-grade reading motivation) to predict fifth-grade reading achievement, controlling for student background, home literacy environment, *and* classroom characteristics. Because only ECLS-K has classroom variables available, the model specification was as follows:

$$(4)\ Y_{5thACHV} = \beta_0 + \beta X_{3rdMOTIV} + \beta X_{3rdACHV} + \beta X_{SES} + \beta X_{Age} + \beta X_{Race} + + \beta X_{Gender} + \beta X_{\#ofBooks} + \beta X_{Read2Child} + \beta X_{ClassSize} + \beta X_{TeachExp} + \beta X_{ReadProjects} + \beta X_{\#ofBooks} + \beta X_{AbilityGroups} + \beta X_{MixedGroups} + \beta X_{ReadTime} + \varepsilon$$

The extent of multicollinearity in Model 2 between third-grade reading achievement and third-grade motivation was assessed using the Variance Inflation Factor (VIF). VIF was also checked in Models 3 and 4 because of possible multicollinearity

between home literacy variables and classroom variables. VIF provides a score that estimates whether or not the variance of the estimated regression increased because of collinearity (Allison, 1999):

$$VIF = \frac{1}{1 - R^2}$$

where R^2 is the coefficient of determination.

A VIF score above 10, is generally viewed as signaling multicollinearity (Allison, 1999).

A partial F-test (incremental F-test) was conducted to compare Models 2 (reduced form), 3 (full model), and 4(full model) and judge whether the added variables improve the overall explanatory power of the model:

$$F = \frac{\frac{RSS_{Reduced} - RSS_{Full}}{Change\ \#\ of\ Regressors\ (Full - Reduced)}}{\frac{RSS_{Full}}{Degrees\ of\ Freedom\ Error\ (full)}}$$

RSS= Residual Sum of Squares

The primary analytic model was chosen based on robustness and parsimony. School fixed effects often were included in models such as those being used in this study to control for across-school observed and unobserved school differences. Although preferable, it was not possible to control for across-classroom differences in the form of classroom fixed effects in these studies because of the small number of students per classroom in the study sample. Although, the target number of students per school in the ECLS-K sample was 24, the actual number of students per school ranged from 1-27 with a mean of 10 students per school (Tourangeau, Nord, Pollack & Atkins-Burnett, 2006, p. 4-5). In SII, student data was not linked to classroom identifiers; thus, it was not possible to conduct classroom fixed effects.

Sensitivity analyses.

In addition to the main analysis of ECLS-K and SII, several sensitivity analyses were conducted. First, an interaction between reading motivation and subgroups of interest is examined to determine whether reading motivation operated differently across subgroups using the following equations:

GENDER: $Y_{5thACHV} = \beta_0 + \beta X_{3rdMOTIV} * X_{Gender} + \beta X_{3rdACHV} + \beta X_{SES} + \beta X_{Age} + \beta X_{Race} + + \beta X_{Gender} + \varepsilon$

RACE/ETHNICITY: $Y_{5thACHV} = \beta_0 + \beta X_{3rdMOTIV} * \beta X_{Race} + \beta X_{3rdACHV} + \beta X_{SES} + \beta X_{Age} + \beta X_{Race} + + \beta X_{Gender} + \varepsilon$

SES: $Y_{5thACHV} = \beta_0 + \beta X_{3rdMOTIV} * \beta X_{SES} + \beta X_{3rdACHV} + \beta X_{SES} + \beta X_{Age} + \beta X_{Race} + + \beta X_{Gender} + \varepsilon$

In order to provide further credibility to the study, I replicated the analysis by limiting both ECLK-K and SII data to a set of students who are more similar in their backgrounds. The analysis was limited to students in both datasets who come from the bottom three income quintiles.

Lastly, I replicated the analysis without the measure of third-grade reading achievement. Although I checked the VIF for multicollinearity, it was important to examine the reading coefficient without third-grade reading achievement for practical implications. For example, if previous achievement is not known by a school district or teacher, then it may be informative to know how much a self-report measure of reading motivation can help predict later achievement without a previous achievement score.

Missing data.

For both the ECLS-K and SII datasets, only complete cases with valid measures of all of the outcome and control variables were used in any part of the analysis. This included measures of fifth-grade achievement, SDQ-reading subscale (third-grade reading motivation), third-grade achievement, age, race, SES, and gender.

In ECLS-K, the number of observations in the longitudinal variable weight for analysis using third and fifth-grade rounds of data is 11,041. The number of observations with complete cases used in the analyses is 10,168, only a 7.9 percent decrease in the overall sample size due to missingness. For ECLS-K, composite SES was responsible for the majority of the missing data (see Table 6 below), however, it was still low at 7.2 percent. When comparing the full sample with the list- wise deletion sample the mean and standard deviation remain almost identical on observed characteristics (see Table 7 below). Thus, the full as well the list-wise sample should not return different estimates.

Table 6. Early Childhood Longitudinal Study–Kindergarten (ECLS-K) Missing Data

Variables	Full Sample: % of Cases with Missing Data	Analytic Sample: List-wise Deletion
3rd read achieve.	.01%	
Composite SES	7.2%	
Age	2%	7.9%
Race	0.01%	
Gender	0.01%	
	n= 11,041	n = 10,168

Note: Full sample is every student who has valid data for 5th grade reading achievement and 3rd grade reading motivation.

Table 7. Characteristics of the Full Early Childhood Longitudinal Study -Kindergarten (ECLS-K) Sample and the Analytic Sample after List-wise Deletion of Cases with Missing Data on Control Variables

	Full Sample		Analytic Sample: List-wise Deletion	
Variables	Mean (SD)	Min-Max	Mean (SD)	Min-Max
3rd read achieve.	127.72 (27.64)	51-201	128.555 (27.59)	51-201
Composite SES	.00 (.81)	-2.48- 2.54	.00 (.81)	-2.48- 2.54
Age	3.49 (1.40)	1-6	3.49 (1.40)	1-6
Race				
White	57.91%	0-1	59.62%	0-1
Black	11.23%	0-1	10.39%	0-1
Hispanic	18.45%	0-1	18.22%	0-1
Other	12.42 %	0-1	11.7%	0-1
Girl	49.89 %	0-1	49.99%	0-1
	n=11,041		n = 10,168	

Note. Full sample is every student who has valid data for 5th grade reading achievement and 3rd grade reading motivation. List wise deletion sample includes observations that do not have any missing covariate data. Other (not displayed) consisted of all other races/ethnicities including Asian, Pacific Islander, Native American, and those who did not report.

For the SII sample, there were 1694 students with valid measures of fifth-grade achievement and SDQ-reading subscale (third-grade reading motivation). Of these, 1,258 also had valid data for all of the other control variables, resulting in a 25 percent loss in sample due to missing data (Table 8). Third-grade achievement and age were responsible for most of the missing data. Although 25 percent was a large amount of missing data,

none of the variables from the full sample compared to the list wise deletion sample were statistically significantly different (Table 9).

Table 8. Study of Instructional Improvement (SII) Missing Data

Variables	Full Sample: % of Cases with Missing Data	Analytic Sample: List Wise Deletion
3rd read achieve.	19.4%	
Composite SES	5.7%	
Age	33.2%	25.7%
Race	4.9%	
Gender	4.9%	
	n= 1,694	n = 1,254

Notes: Full sample is every student who has valid data for 5th grade reading achievement and 3rd grade reading motivation.

Table 9. Characteristics of the Study of Instructional Improvement (SII) Full Sample and the Analytic Sample after List Wise Deletion of Cases with Missing Data on Control Variables

	Full Sample		Analytic Sample: List Wise Deletion	
Variables	Mean (SD)	Min-Max	Mean (SD)	Min-Max
3rd read achieve.	611.73 (36.86)	427-780	612.33 (37.30)	427-780
Composite SES	-.01 (.80)	-1.61 – 2.93	-.02 (.78)	-1.61 – 2.93
Age	110.86 (5.99)	79-141	110.86 (6.04)	79-141
Race				
White	24.73%	0-1	23.92%	0-1
Black	46.52%	0-1	48.33%	0-1
Hispanic	18.71 %	0-1	18.50%	0-1
Other	.10.04%	0-1	9.25%	0-1
Girl	54.25%	0-1	53.51%	0-1
	n= 1,694		n = 1,254	

Note: Full sample is every student who has valid data for 5th grade reading achievement and 3rd grade reading motivation. List wise deletion sample includes observations that do not have any missing covariate data. Other (not displayed) consisted of all other races/ethnicities including Asian, Pacific Islander, Native American, and those who did not report.

Results

Descriptive findings showed that, on average, students generally self-reported high levels of reading motivation. However, girls, Black, Hispanic, and high SES students reported the highest levels. When previous achievement was omitted, results suggested that early reading motivation can help predict later achievement. However,

after controlling for background characteristics that include previous achievement, it was no longer predictive of later achievement.

Self-Description Questionnaire (SDQ) reading subscale reliabilities.

SDQ reading subscale reliabilities are relatively high across all subgroups. However, the subscale was more reliable for the ECLS-K sample, and disaggregated data showed that the subscale was also more reliable for particular subgroups (see Table 10). Cronbach's alpha reliability estimates range from **α** = .72 for Hispanic students in SII to **α** = .85 for White students in ECLS-K. The scale was most reliable for White students and least reliable for Black and Hispanic students. Cronbach's alpha reliabilities were also calculated by income quintile using ECLS-K. The bottom income quintile had the lowest reliability **α** = .79, the next four income quintiles including the top quintile had the same reliability **α** =.84.

Table 10. Self-Description Questionnaire (SDQ) Reading Subscale Cronbach Alpha Reliability Estimates by Race/Ethnicity and Gender

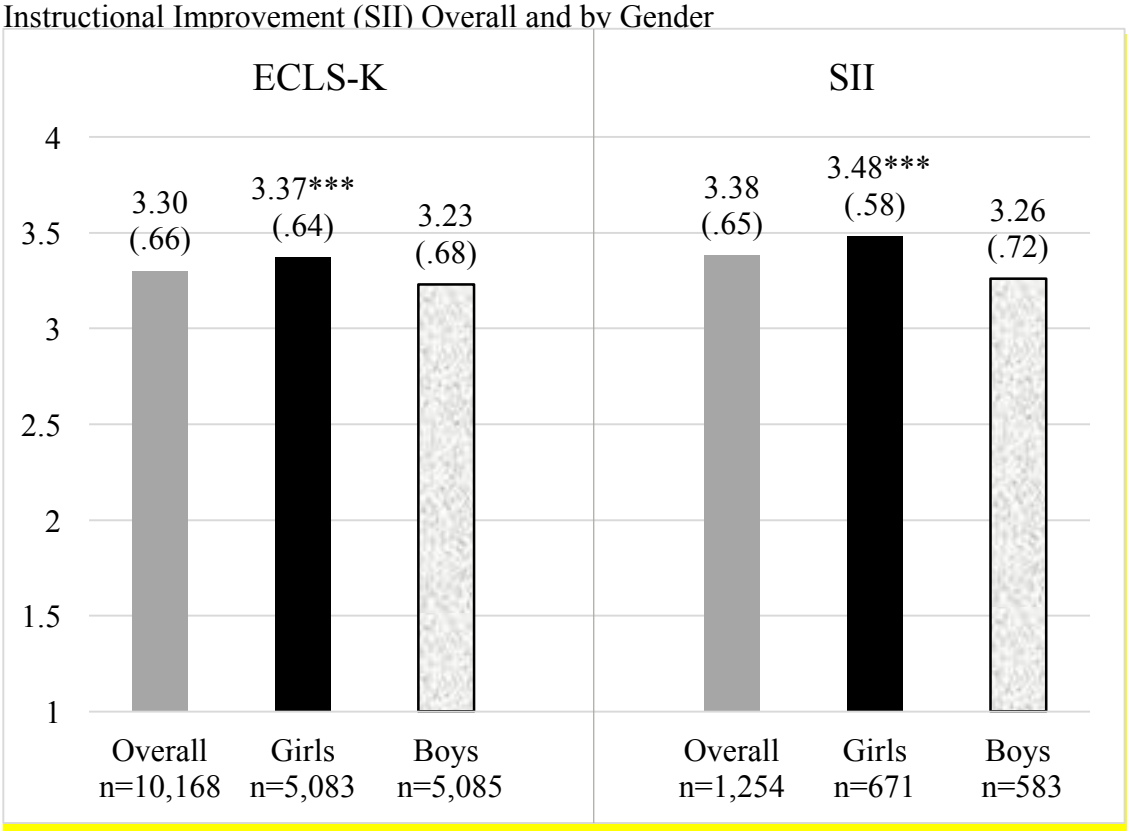
	Early Childhood Longitudinal Study-Kindergarten (ECLS-K)	Study of Instructional Improvement (SII)
Overall	0.83 (n=10,168)	0.77 (n=1,254)
Gender:		
Girls	0.84 (n=5,083)	0.73 (n=671)
Boys	0.83 (n=5,085)	0.79 (n=583)
Race/Ethnicity:		
White	0.85 (n=6,062)	0.82 (n=300)
Black	0.82 (n=1,056)	0.75 (n=606)
Hispanic	0.81 (n=1,853)	0.72 (n=232)

Note: Other (not displayed) consisted of all other races/ethnicities including Asian, Pacific Islander, Native American, and those who did not report. In ECLS-K **α** =.82 (n=1,197) and **α** =.81 (n=116) in SII.

SDQ reading motivation subscale.

Data for students in both study samples reported high reading motivation levels, 3.30 (standard deviation: .66) in ECLS-K and 3.38 (standard deviation: .65) in SII on a 1-4 scale. The distribution was skewed toward more positive responses. However, there were subtle nuances across student subgroups. Figure 2 below shows that, in both datasets, girls reported significantly higher reading motivation levels than do boys. Girls also had a smaller spread of responses than do boys, as evidenced by the smaller standard deviations for girls than for boys.

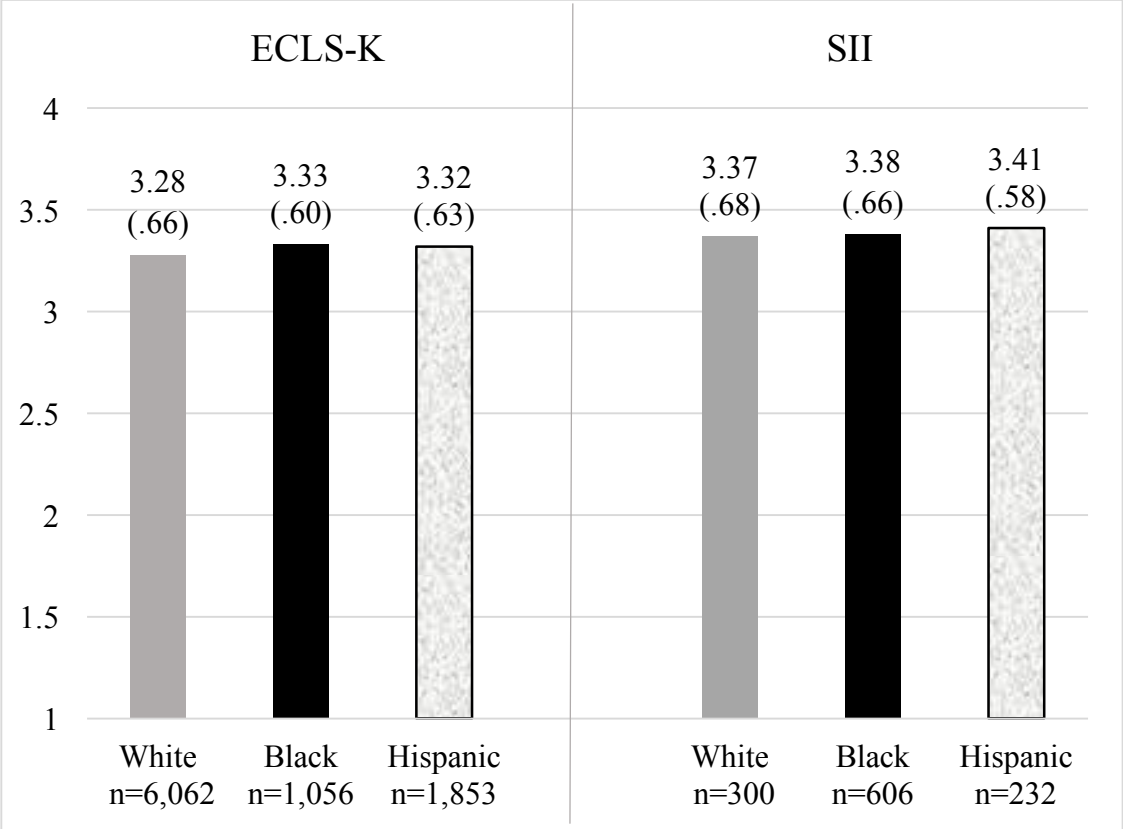
Figure 2. Self-Description Questionnaire (SDQ) Reading Subscale Mean (Standard Deviation) in Early Childhood Longitudinal Study-Kindergarten (ECLS-K) and Study of Instructional Improvement (SII) Overall and by Gender



Note: The range of possible item scores is 1-4; *** $p < .001$ Girls vs. Boys

In both datasets, Black and Hispanic students reported higher reading motivation levels than did White students. However, none of the differences were statistically significant at the .05 level (White students served as reference group). Figure 3 below shows levels by race/ethnicity for both datasets. The distributions were all positively skewed.

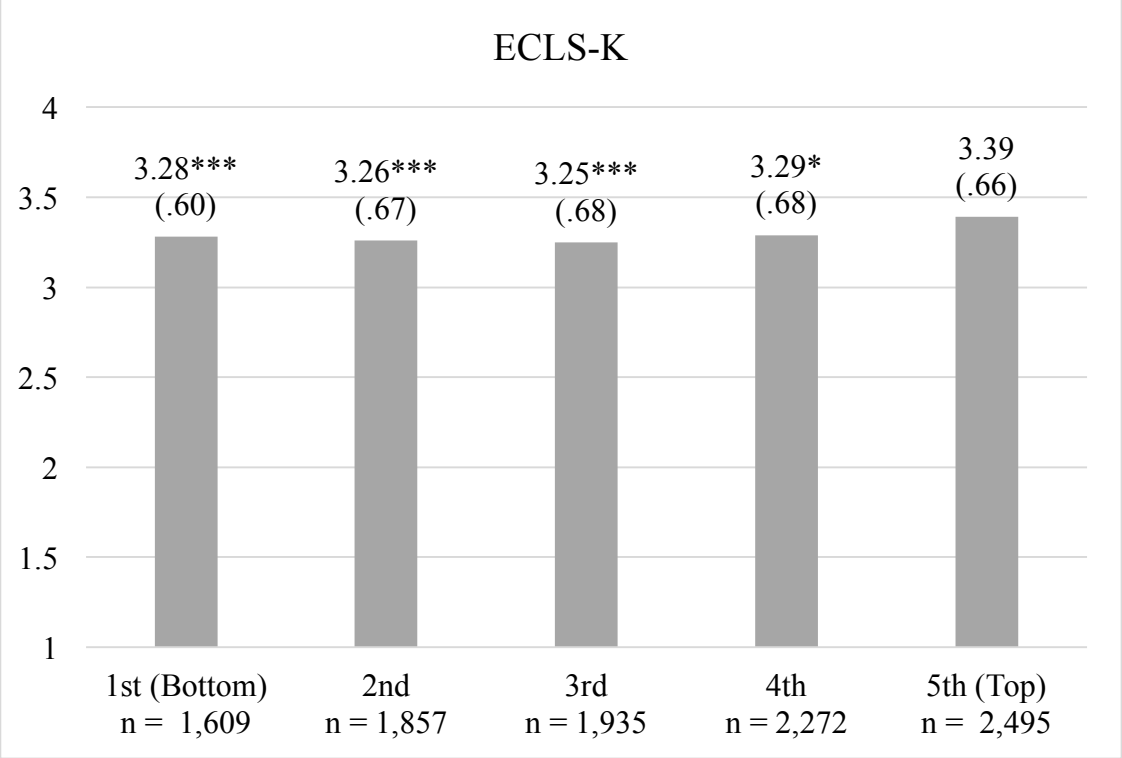
Figure 3. Self-Description Questionnaire (SDQ) Reading Subscale Mean (Standard Deviation) in Early Childhood Longitudinal Study-Kindergarten (ECLS-K) and Study of Instructional Improvement (SII) by Race/Ethnicity



Notes: The range of possible item scores is 1-4. Other (not displayed) consisted of all other races/ethnicity including Asian, Pacific Islander, Native American, and those who did not report. In ECLS-K mean 3.30 and .80 SD (n=1197) and mean 3.32 and .73 SD (n=116) in SII.

When disaggregated by income quintile using ECLS-K, as incomes increase so did reading motivation levels (Figure 4) (note that income was not disaggregated for the SII sample because it is a predominately low-income sample). The top income quintile had the highest reading motivation score at 3.39 (.66), and it was statistically different from each of the other four quintiles. The distributions for each income quintile were positively skewed.

Figure 4. Self-Description Questionnaire (SDQ) Reading Subscale Mean (Standard Deviation) in Early Childhood Longitudinal Study-Kindergarten (ECLS-K) and Study of Instructional Improvement (SII) by Income Quintile



Notes: The range of possible item scores is 1-4. Reference group is top income quintile. *$p < .05$; ***$p < .001$;

Reading achievement scores.

All reading achievement scores were standardized z-scores to allow for comparisons across datasets. White students and female students had the highest scores, and Black, Hispanic, and male students had the lowest scores. The gaps between White and Black students, and between White and Hispanic students were consistent in both datasets. White students scored about .7 standard deviations above Black students, and between .45 (in SII) and .6 standard deviations (in ECLS-K), respectively, above Hispanic students. However, the gap between girls and boys was larger in SII than in ECLS-K : Girls scored .38 standard deviations above boys in SII compared to .14

standard deviations in ECLS-K (See Table C.1 in Appendix C for more details on 5th grade reading achievement scores). When ECLS-K data were disaggregated by income quintile, the greatest disparity was between students in the bottom and top income quintiles (1.47 standard deviations). Achievement scores also increased signifiantly as income quintile increased (see Table C.2 in Appendix C).

Predictive results.

Model 1, $Y_{5thACHV} = \beta_0 + \beta X_{3rdMOTIV} + \varepsilon$, estimated the ability of reading motivation to predict reading achievement, not controlling for other variables. In the ECLS-K sample, SDQ-reading subscale (third-grade reading motivation) explained only 3.66 percent of the variance of fifth-grade reading achievement (standardized beta coefficient of β = .19 and $p < .001$). For the SII sample, SDQ-reading subscale (third-grade reading motivation) explained 5.14 percent of the variance with a standardized beta coefficient of β = .23 and $p < .001$. Said differently, without controlling for any other variables, on average, increasing SDQ-reading subscale (third-grade reading motivation) by one standard deviation was associated with a .19 and .23 standard deviation increase in fifth-grade reading achievement (for the ECLS-K and SII samples, respectively).

Model 2, $Y_{5thACHV} = \beta_0 + \beta X_{3rdMOTIV} + \beta X_{3rdACHV} + \beta X_{SES} + \beta X_{Age} + \beta X_{Race} + + \beta X_{Gender} + \varepsilon$, examined the association that remains between reading motivation and reading achievement after controlling for student background characteristics. Table 11 shows that in Model 2 the explained variance increases to 74.48 percent for the ECLS-K sample and 41 percent for the SII sample. Interestingly, the standardized beta coefficients on the reading motivation variable in these models are much smaller β = .01 with $p > .05$ and β = .08 with $p < .01$ for the ECLS-K and SII

samples, respectively. This means that on average one standard deviation increase in third reading motivation equates to .01 and .08 standard deviation increase in predicted fifth-grade reading achievement for the ECLS-K and SII samples, respectively. In comparison to other coefficients in Model 2, like previous reading achievement and SES, reading motivation was no longer showing a strong association with reading achievement.

Table 11. Model 2: Fifth-grade Reading Achievement- Estimated Relationship between SDQ- Reading Subscale and Fifth-grade Reading Achievement, Controlling for Prior Achievement and Background Characteristics

	Early Childhood Longitudinal Study-Kindergarten (ECLS-K)		Study of Instructional Improvement (SII)	
Variable	*Beta*	SE	*Beta*	SE
Third-grade Motivation	.01	.009	.08**	.024
Third-grade Achievement	.80***	.006	.53***	.034
SES	.09***	.013	.10***	.027
Age	-.01*	.010	-.04^{+}	.025
Race (White = omitted)				
1. Black	-.14**	.033	-.32***	.082
2. Hispanic	-.01	.0145	-.12	.088
3. Other	.01	.033	-.11	.096
Gender = Girl (Boy =omitted)	.01	.012	.22***	.046
Adjusted R^2	.759			.410
	n = 10,168			n = 1,254

Notes: All variables, except gender and race, are standardized for ease of comparison. Other (not displayed) consisted of all other races/ethnicities including Asian, Pacific Islander, Native American, and those who did not report. The Variance Inflation Factor (VIF) for Model 2 was less than 10 (1.18). Specifically, for third-grade reading achievement the VIF is 1.48, meaning that there is likely minimal multicollinearity (Allison, 1999).$^{+}p < .10$; $*p < .05$; $**p < .01$; $***p < .001$

The explained variance for the SII sample (41 percent) was considerably lower than that for the ECLS-K sample (74.88 percent). This finding can be explained partially by the lower reliability of the reading achievement measure used in SII compared to the reading measure used in ECLS-K: KR20 = .83 versus **α** = .93 in fifth-grade and KR20 = .79 versus **α** = .93 in third-grade for the SII as compared with the ECLS-K samples, respectively (CBT-McGrawHill, 1997; Tourangeau, et al., 2006). Additionally, the SDQ-reading subscale (third-grade reading motivation) measure was also less reliable for the SII than for the ECLS-K sample (α = .77 versus **α** =. 83, respectively).

Models 3 and 4 included home literacy and classroom variables. Model 3 included number of books in the home and frequency read to child. In addition to these home characteristics, Model 4 added classroom covariates, such as time spent reading, frequency with which the teacher divided the class into instructional groups among other variables (see Table E.1 in Appendix E for details). Notably, the coefficient on reading motivation and other coefficients did not differ in size, sign, or significance between Model 2 and Models 3 and 4. Moreover, the adjusted R^2 in these more inclusive models decreased slightly from that in Model 2 (i.e., by less than one percentage point).

Results from Model 3 and 4 (see Tables D.1 and E.1 in Appendix D and E for more details) that included home literacy and classroom characteristics suggest that these variables add "noise to the estimates." However, the partial F-test was run as an additional robustness check. The partial F-test compared Model 2 (reduced) to Model 3 (full), and Model 2 (reduced) to Model 4 (full). Results indicate that Model 3, which included home literacy covariates, ($p > .05$) did not perform significantly better or worse than Model 2. However, Model 4, which included classroom variables, performed

significantly worse than did model 2 ($p < .05$). Although Model 4 controls for classroom characteristics, it decreased the percentage of explained variance (adjusted R^2).

Having determined that the addition of neither the home nor school variables improved the predictive power of the analytic model, a variant of model 2 was estimated (Model 5) that added school fixed effects:

$$(5)\ Y_{5thACHV} = \beta_0 + \beta X_{3rdMOTIV} + \beta X_{3rdACHV} + \beta X_{SES} + \beta X_{Age} + \beta X_{Race} + \beta X_{Sex} + \alpha_{schoolfixed} + \varepsilon$$

Table 12 below shows the results of Model 5 with school fixed effects for both ECLS-K and SII. The adjusted R^2 increased about five percentage points in both datasets: from 75 to 82 percent ECLS-K and from 41 to 46 percent for SII. The size of the SDQ-reading subscale (third-grade reading motivation) and reading achievement coefficients were essentially unchanged by the addition of the school indicator variables. However, the reading motivation coefficient now leaned towards significance ($p < .10$) in ECLS-K. In both analyses, the coefficient on the SES composite variable decreased, but remained statistically significant at the .05 level. Age and race/ethnicity coefficients were no longer significant.

Table 12. Model 5: Fifth-grade Reading Achievement-Estimated Relationship between SDQ- Reading Subscale and Fifth-grade Reading Achievement, Controlling for Prior Achievement and Background Characteristics with School Fixed Effects

	Early Childhood Longitudinal Study-Kindergarten (ECLS-K)		Study of Instructional Improvement (SII)	
Variable	*Beta*	SE	*Beta*	SE
Third-grade Motivation	.01^{+}	.006	.08**	.025
Third-grade Achievement	.80***	.004	.53***	.039
SES	.05***	.010	.08**	.027
Age	-.01^{+}	.006	-.03	.031
Race (White = omitted)				
1. Black	-.10	.064	-.24^{+}	.135
2. Hispanic	.03	.019	-.13	.125
3. Other	.01	.025	-.13	.152
Gender = Girl (Boy =omitted)	.02	.017	.22***	.049
Adjusted R^2	.816		.457	
	n = 10,168		n= 1,254	

Notes. Other (not displayed) consisted of all other races/ethnicities including Asian, Pacific Islander, Native American, and those who did not report. $^{+}p < .10$; $*p < .05$; $**p < .01$; ***p < .001

Sensitivity analyses results.

The first sensitivity analysis conducted an interaction effect with the main model, Model 5 to examine if the reading motivation coefficient operated differently across student subgroups defined by SES, race/ethnicity, and gender. None of the interactions

suggested that the reading motivation operated differently subgroups of students in Model 5 ($p > .10$) (see Appendix F for more details).

The second sensitivity analysis restricted both datasets to students of similar SES (bottom three income quintiles) to allow a more "apples to apples" comparison between datasets and attempt to explain the disparity in in the percent of variance explained by the models for the two samples. In Table 13, the reading motivation coefficient in SII remains unchanged. However, in ECLS-K the reading motivation coefficient decreased in size. Third-grade reading achievement coefficients increase relative to Model 2 and remain significant at the $p < .001$ level.

Table 13. Model 5: Fifth-grade Reading Achievement-Estimated Relationship between SDQ- Reading Subscale and Fifth-grade Reading Achievement, Controlling for Prior Achievement and Background Characteristics with School Fixed Effects for Students in the Bottom Three Income Quintiles

	Early Childhood Longitudinal Study-Kindergarten (ECLS-K)		Study of Instructional Improvement (SII)	
Variable	*Beta*	SE	*Beta*	SE
Third-grade Motivation	.00	.015	.04*	.015
Third-grade Achievement	.81***	.010	.49**	.039
Age	-.01	.007	-.00	.035
Race (White = omitted)				
1. Black	-.08	.010	-.20	.110
2. Hispanic	.04	.008	-.10	.101
3. Other	.01	.005	-.01	.009
Gender = Girl (Boy =omitted)	.01	.030	.15**	.0009
Adjusted R^2	.794		.449	
	n = 6,968		n= 1,069	

Notes. Other (not displayed) consisted of all other races/ethnicities including Asian, Pacific Islander, Native American, and those who did not report; $^{+}p < .10$; *$p < .05$; **$p < .01$; ***p < .001

The last sensitivity analysis excluded third-grade reading achievement. The reasoning for this decision was threefold: (1) concerns for multicollinearity (even if addressed by the Variance Inflation Factor (VIF)), (2) attempt to explain the differences in size and significance of the reading motivation coefficient when using ECLS-K compared to SII, and (3) for practical implications. In practice, an educator or school district may not have a student's previous achievement data. Thus, it is important to

explore reading motivation's predictive utility without a previous achievement score. When Model 5 was run without third-grade reading achievement, results were similar to those of Model 1 in which the bivariate relationship was examined. Table 14 shows the results for ECLS-K and SII. In Model 1 and Model 5 the reading motivation coefficient remained significant and the coefficient was essentially similar with both datasets. However, Model 5 logically had a much higher adjusted R^2 because many other variables were now controlled compared to Model 1. Results from the above Table 12 and below Table 14 suggested that the third-grade reading achievement measure absorbs any variance the SDQ-reading subscale (third-grade reading motivation) would have added.

Table 14. Model 5: Fifth-grade Reading Achievement-Estimated Relationship between SDQ- Reading Subscale and Fifth-grade Reading Achievement, Controlling for Background Characteristics *Without* Third-grade Reading Achievement

	Early Childhood Longitudinal Study-Kindergarten (ECLS-K)		Study of Instructional Improvement (SII)	
Variable	*Beta*	SE	*Beta*	SE
Third-grade Motivation	.18***	.010	.19***	.030
SES	.31***	.017	.16***	.029
Age	.05***	.010	-.07*	.031
Race (White = omitted)				
1. Black	-.33**	.109	-.43*	.146
2. Hispanic	-.06	.035	-.19	.141
3. Other	.02	.051	-.23	.171
Gender = Girl (Boy =omitted)	.11	.040	.31***	.056
Adjusted R^2	.532		.274	
	n = 10,168		n= 1,254	

Notes. Other (not displayed) consisted of all other races/ethnicities including Asian, Pacific Islander, Native American, and those who did not report; $^{+}p < .10$; $*p < .05$; $**p < .01$; ***p < .001

Limitations

This study does not attempt to make causal claims; it is strictly exploratory. Reading motivation of their-grade students does not strongly predict achievement two years later. However, the measurement of reading motivation in later grades, such as middle or high school, could serve as a better predictor variable for achievement than measurement of early reading motivation because students may be more self-aware of

their perceived competence and interest in reading (Dunning, Heath, & Suls, 2004). Future research can examine datasets with measures of reading motivations in both primary and secondary grades, and long-term outcomes.

Measurement is another issue to consider. Self-report scales are subject to self-assessment, reference, and social-desirability bias (West et al., 2013). Self-assessment bias can occur because a student is unrealistic about his/her abilities, ignores information and/or lacks information about his/her abilities (Dunning, Heath, & Suls, 2004). Reference bias is the idea that students respond in reference to their classmates, school, and/or peer group, while social-desirability bias occurs when a student answers positively to please others (West et al., 2013). Additionally, measurement developers should be intentional and culturally conscious when developing scales; constructs like motivation may appear and manifest themselves differently in different cultures and languages (Almlund, Duckworth, Heckmand & Kautz, 2011). Lastly, latent constructs, like motivation, typically have many definitions and measurement methods in the field, which makes it difficult to generalize reading motivation findings from one study to the next (Conradi et al., 2013)

Discussion

This study validates and challenges previous research on the role of reading motivation in predicting reading achievement. On average girls report higher reading motivation levels than boys confirming prior research (Marinak & Gambrell, 2010; Wigfield & Guthrie, 1999; Applegate & Applegate, 2010; Jacobs et al., 2002; Eccles et al., 1993; Pinrich et al., 2007). However, findings from two separate datasets challenge the common belief that, on average, young students of color are not motivated to read

(Blake, 2017). Moreover, reading motivation is not a strong predictor of later reading achievement after controlling for background student characteristics. However, it may be a useful predictor when previous achievement is not known.

A robust literature supports the finding that girls report higher reading motivation levels than boys (Applegate & Applegate, 2010; Eccles et al., 1993; Jacobs et al., 2002; Marinak & Gambrell, 2010; Pinrich et al., 2007; Wigfield & Guthrie, 1999). A possible explanation may be that girls develop language skills earlier than boys (Erickson et al., 2012), which may make girls more inclined to learn how to read before boys. They would thus experience earlier enjoyment from reading, as well as higher levels of reading motivation. Nonetheless, given the conventional prevailing stereotype that girls "like" reading and boys "like" science (McKenna et al., 1995), as a society we need to be cognizant of reinforcing gender-linked behaviors. Stereotypical gender labeling/typing has a significant influence on differential life experiences, career choices, and ultimately, life outcomes (Bussey & Bandura, 1999).

On average all students reported high reading motivation levels, however, Black and Hispanic students reported the highest levels. Prior literature on the Black-White "self-esteem gap" can elucidate our-understanding of why they self-report higher levels of reading motivation. Self-esteem may be related to how students respond to self-report scales. Two different meta-analyses (Gray-Little & Hafdahl, 2000; Twenge & Crocker, 2002) found that before the age of ten, White students have higher self-esteem than Black students, however after the age of ten Black students surpass White students. Although students in this study are slightly younger, nine years old—the age equivalent to being enrolled in third-grade in the U.S, if self-esteem is related to how students respond on

self-report scales, the self-esteem trend may actually reverse directions at least one year earlier than previously anticipated.

For Hispanic students, many of whom come from immigrant backgrounds, the immigrant paradox can help explain their high levels of self-reported reading motivation. The immigrant paradox is the phenomenon that occurs when immigrant children and those born to immigrant parents (first and second-generation) outperform their third-generation peers (students born in the U.S. to a U.S born parents) in school, even though they are less assimilated to the US and are more likely to be low-income (Palacios, Guttmannove, & Chase-Lansdale, 2008). Hu-Dehart and Garcia Coll (2010) found that in addition to first and second generation students outperforming third-generation students, immigrant students had more positive attitudes about teachers and their school. This idea is further supported by previous research on immigrant communities where parents described the importance they place on non-cognitive skills, such as motivation and social skills, more so than cognitive skills (Okagaki & Strenberg, 1993). Similarly, a recent report found that teachers rated Hispanic students highly on social skills during elementary school (Padilla, Cabrera, & West, 2017).

CHAPTER 4: PART 2, A VALIDATION STUDY OF A KINDERGARTEN READING MOTIVATION SCALE (KRMS)

This study is nested within a larger Institute of Education Sciences-funded Goal 3 Efficacy Evaluation of an integrated science and literacy curriculum, Zoology One: Kindergarten Research Labs. The efficacy evaluation of Zoology One takes place in twelve schools in Northeast Philadelphia that were recruited by researchers at the University of Pennsylvania. Within those twelve schools, teachers were randomly assigned to either treatment or control classrooms.

This study develops and validates a scale to measure reading motivation for kindergarten students. It was motivated by the need to measure reading motivation as an intermediate outcome for the Zoology One efficacy evaluation. As mentioned in previous sections, Zoology One is designed to target the traditional literacy domains while also creating a culture of reading (Institute of Education Sciences, n.d.). This culture is fostered by providing students with independent reading time, autonomy of book choice, and interesting texts with the expectation that these qualities will promote reading motivation (Institute of Education Sciences, n.d.).

The development of the Kindergarten Reading Motivation Scale (KRMS) followed the American Psychological Association (2014) standards for measurement development[5]. Reading motivation is conceptualized using the aforementioned Eccles and Wigfields' two-question framework: 'Can I be a good reader and 'Do I want to be a

[5] **APA Standard 4.0:** Test developers and publishers should document steps taken during the design and development process to provide evidence of fairness, reliability, and validity for intended uses for individuals in the intended examinee population.

good reader?' After two pilot studies testing student response methods and item clarity, the final KRMS instrument consists of 19 items.

Research Questions

The purpose of this study is to examine the instrument's (1) scale validity: criterion-concurrent and construct validity, and (2) scale reliability. Specifically, the research question are as follows:

- Criterion-concurrent validity:
    - Do specific items on the KRMS correlate with reading achievement scores on the specific Woodcock Reading Mastery Test (WRMT) sections?
    - Do students' average score on the KRMS correlate with reading achievement scores on specific WRMT sections?
- Construct validity
    - Do the scale's items hold together as one scale?
        - What are the item-total correlations?
        - What is the internal structure of the KRMS?
    - Discriminant validity:
        - Do Kauffman math achievement test scores correlate with the KRMS?
    - Convergent validity:
        - Do teachers' student reading motivation reports correlate with students' KRMS scores?
- Reliability:
    - What is the internal consistency of the KRMS?

Scale Development Process

Before beginning the development of the reading motivation instrument, I established the following purpose for the instrument: [6]

> To measure kindergarten students' reading motivation for research and instructional purposes. Researchers and other stakeholders can use it to measure motivation as a mediator or an intermediate outcome (summative assessment). Educators can use the scale as mode of formative assessment to adjust their teaching strategies to students' motivational patterns.

Next, I conceptualized reading motivation using the aforementioned three theories— self-efficacy, expectancy-value, and self-determination theory−and Eccles and Wigfield's (2002) framework of rationalizing reading motivation by answering two questions: (1) Can I be a good reader? and (2) Do I want to be a good reader? Many theorists and education scholars agree that motivation should not be studied broadly, but rather by subject-domain (Bandura, 1994) because behavior cannot be predicted based on a general goal-orientation (Eccles et al., 1993; Wigfield and Eccles, 1992). Although children as young as five years old *can* recognize their competence across domains in reading and math (Eccles et al., 1993; Marsh et al., 2003), within each domain they likely have *not* yet developed nuanced understandings of subdomains, such as reading attitudes, self-efficacy, and competencies (Morgan & Fuchs, 2007). Thus, even though a majority of existing reading motivation scales attempt to measure distinct subdomains of reading motivation, this study (focused on kindergarten students) hypothesizes and empirically

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[6] **APA Standard 4.1:** Test specifications should describe the purposes of the test, the definition of the construct or domain measured, the intended examinee population, and interpretation for intended uses. The specifications should include a rationale supporting the interpretations and uses of test results for intended purposes.

tests whether KRMS is comprised of one general factor, reading motivation, or multiple subdomains.

As noted previously, an extensive literature review of current research on reading motivation and its measurement identified 18 scales. Table A.1 in Appendix A provides a detailed list of all 18 scales, including their target population, study sample size, psychometric properties, and subdomains measured. Given the aforementioned purpose of the instrument, in consultation with literacy experts and peer researchers scales were then only further considered if they had the following inclusionary criteria:

- **Scale explicitly stated that it attempted to measure reading motivation.** This meant excluding well-known scales such as Pre-School Reading Attitude Scale (Saracho, 1988), and the Elementary Reading Attitude Scale (Mckenna & Kear, 1990).
- **Scale was developed specifically for young elementary students.** This meant excluding most scales because they were created for older elementary students.
- **Scale was self-report**. Only self-report instruments were considered for practical administration and resource constraints. This meant excluding Wilson and Tranin's (2007) instrument that required students to perform specific tasks. Observing students is not always feasible for both researchers and teachers, which decreases the utility of the instrument.

Of those 18 scales, seven met the inclusion criteria and were analyzed further (Baker & Scher, 2002; Chapman & Tumner, 1995; Coddington & Guthrie, 2009; Marinak et al., 2015; Mata, 2011; Sperling, Sherwood & Hood, 2013; Zheng et al., 2016). However,

none of the scales were adequate for the measurement of reading motivation in kindergarten students for the following reasons:

- **Children's Motivation for Reading Scale (MRS)** (Baker & Scher, 2002) was created for first grade urban students. Its items did not assume reading knowledge and were developmentally appropriate for kindergarten students. However, items were in third person rather than question form and, as a result, may be more difficult for young students to understand because of their abstract nature. In addition, student responses were recorded by having them choose between two stuffed animals—the animal (happy or sad) s/he most identified with. Although internal consistency was high, Cronbach **α** = .83, the response method could have potential inter-rater reliability problems when administered to large numbers of students. Also, criterion validity was not demonstrated. Issues with the third person item format, inter-rater reliability, and lack of criterion validity excluded MRS.
- **Reading Self-Concept Scale** (Chapman and Tumner, 1995) was used with five, six, and seven-year olds in New Zealand. However, questions were *not* at the developmental reading level of an average kindergarten student in the U.S. (e.g. Can you work out hard words in a story even if there are no pictures?) because they assumed reading ability, and a majority of kindergartners in the U.S. cannot read yet (Kena et al., 2016). Cronbach's reliability alpha was high at **α** = .85. However, criterion validity was not demonstrated. Thus, potential cultural differences, developmental inappropriateness, and lack of criterion validity excluded the Reading Self-Concept Scale.

- **Young Readers Motivation Questionnaire** (YRMQ) (Coddington and Guthrie, 2009) was used with White suburban first graders. It also asked questions that were not at the developmental reading level of a kindergarten student (e.g. Can you work out hard words by yourself?) because its questions assumed reading ability, and a majority of kindergartners cannot read yet (Kena et al., 2016). Cronbach reliability alpha was moderate at **α** = .70. Criterion validity was not demonstrated. Thus, potential cultural differences, developmental inappropriateness, and lack of criterion validity excluded the YRMQ.
- **Me and my Motivation Reading Profile** by Marinak et al. (2015) was validated using students in kindergarten through second grade in three east coast states. While some questions appeared appropriate for second graders, not all questions were developmentally appropriate for kindergarten students (e.g. How do you feel when you are in a group talking about books?). Young students have not yet developed such nuance understanding of their feelings in relation to others (Morgan & Fuchs, 2007). Cronbach reliability alpha for all students was high at **α** = .86. The authors did not report reliability levels by grade, and criterion validity was not established. Thus, developmental inappropriateness, unknown information about the reliability specifically for kindergarten students, and lack of evidence for criterion validity excluded Me and my Motivation Reading Profile.
- **Motivation for Reading and Writing Profile (MRWP)** (Mata, 2011) was used for Portuguese-speaking kindergartners. Cronbach reliability alpha for all students was high at **α** = .80, but criterion validity was not established. Due to translation

imprecisions, potential cultural differences, and lack of criterion validity MRWP was not considered.

- **Emergent Readers Motivation and Reading Scale (ERMAS)** (Sperling, Sherwood & Hood, 2013) was administered in a small city to preschool and kindergarten students. Reliability and criterion validity were not reported, and thus ERMAS was excluded.
- **Emergent Reading Motivation Scale (ERMS)** (Zheng et al., 2016) was administered to urban preschool students. The administration method involved a complicated dialogue with puppets named Lanian and Dindin. Cronbach reliability alpha for all students was moderate at $\boldsymbol{\alpha} = .75$, and criterion validity was not established. Issues with inter-rater reliability given the complex response method and lack of criterion validity excluded ERMS.

As a reference for item development of the KRMS, I reviewed the subdomains of the identified 18 reading motivation instruments. Table 15 presents each unique subdomain identified and categorized under this study's conceptualization of reading motivation: (1) Can I be a good reader? and (2) Do I want to be a good reader? From the 18 scales, 22 distinct subdomains were identified. The numbers in parentheses in Table 16 represent the frequency each subdomain was found in the identified scales (i.e. Enjoyment (4) means that the subdomain of 'enjoyment' was found in four of the 18 identified scales).

Table 15. Subdomains of Reading Motivation

Can I be a good reader?			Do I want to be a good reader?		
Perceptions of Difficulty (3)	Self-Concept (4)	Perceived Competence (4)	Value (6)	Intrinsic Motivation (4)	Enjoyment (4)
Literacy-Out-Loud (1)	Reading Performance Goals (1)	Work Avoidance (1)	Curiosity (2)	Reasons For Reading (1)	Grades (2)
Literacy Environment (1)	Reading Learning Goals (1)	Reading Orientation (1)	Compliance (1)	Emotional Regulation (2)	Competition (3)
Attitude (5)			Social (1)	Involvement (1)	Recognition (2)

Selecting focal domains.

After a review of the subdomains from the existing reading motivation instruments (see Table 15) and consultation with various literacy experts[7] (see Table G.1 in Appendix G for experts' qualifications), I concluded that a developmentally appropriate reading motivation scale for kindergarten students would consist of questions from the following four subdomains: (1) enjoyment ("Do I want to be a good reader?"), (2) value ("Do I want to be a good reader?"), (3) social motivation ("Do I want to be a good reader?"), and (4) perceived-competence ("Can I be a good reader?").

[7] APA **Standard 4.8:** The test review process should include empirical analyses and/or the use of expert judges to review items and scoring criteria. When expert judges are used, their qualifications, relevant experiences, and demographic characteristics should be documented.

Item selection and wording.

After establishing the four subdomains from which to create questions for the new KRMS, items from all 18 scales that measured those four subdomains were thoroughly examined and chosen based on: (1) judgments on content quality, (2) construct-relevance, and (3) developmental appropriateness. Table 16 lists all items that were analyzed for inclusion. The names of scales having used the items previously are in parentheses and those items included in KRMS are marked with an asterisk

Table 16. Items from Prior Scales Used to Construct the Kindergarten Reading Motivation Scale (KRMS) in the Following Subdomains: Enjoyment, Value, Perceived Competence, and Social Motivation

Subdomains of Reading Motivation
Enjoyment
Reading is good (MRWP-Enjoyment)
I read stories about fantasy and make believe (MRQ-Enjoyment)
I like mysteries (MRQ-Enjoyment)
I enjoy a long, involved story or fiction book (MRQ-Enjoyment)
I read a lot of adventure stories (MRQ-Enjoyment)
I feel like I make friends with people in good books (MRQ-Enjoyment)
I make pictures in my mind when I read (MRQ-Enjoyment)
*I like to read (MRS-Enjoyment, ERMAS)
*I like to be read to (MRS-Enjoyment)
*I like to look at books by myself (MRS-Enjoyment, MRWP-Enjoyment, ERMAS)
*I get bored when the teacher reads stories (MRS-Enjoyment, ERMAS)
I think reading is a good way to spend time (MRS-Enjoyment, MRWP-Enjoyment, ERMAS)
I like to get books for presents (MRS-Enjoyment, ERMAS)
*I think reading is fun/boring (MRS-Enjoyment, YRMQ-Orientation, MRWP-enjoyment)
Value
*I think books can be used to find answers to questions (MRS-Value)
I think I will need to know how to read to do well in school (MRS-Value, MRWP-Value)
*I think people can learn new things from books (MRS-Value, MRWP-Value)
I think people can find things out from magazines and newspapers (MRS-Value)
It is important to know how to read (MRWP-Value)
When I have free time, I spend (MRP-Value, ERMAS; MMRP-Value)
*When my teacher reads books out loud, I think it is (MRP-Value, ERMAS)
I think becoming a good reader is (MRP- Value)

I think libraries are (MRP- Value, ERMAS)

People who read a lot are (MRP- Value, ERMAS)

I tell my friends about good books I read (MRP- Value; ERMAS)

My friends think reading is (MRP- Value, ERMAS; MMRP-Value)

Reading a book is something I like to do (MRP- Value, MRP-Value, ERMAS)
*When someone gives me a book for a present (MRP-Value, ERMAS; MMRP-Value)

Learning to read is (MMRP-Value)

How do you feel about learning to read (MMRP-Value)

I think libraries are (MMRP-Value)

How do you feel about reading with others? (MMRP-Value)

Do you have favorite books? (MMRP-Value)

For me becoming a good reader is (MMRP -Value)

Perceived Competence

I think I will do well in reading next year (MRQ-efficacy, MRWP-Self-concept)
*Reading is Easy/hard for me (MRQ-Efficacy, ERMAS, RSCS-Competence; MMRP-Self-Concept)

* I think I will be a good reader (ERMAS, ABLE-belief as reader)

Can you workout what a story means? (RSCS-Competence)
Can you work out hard words in a story even if there are no pictures? (RSCS-Competence; YRMQ- Efficacy)

Are you good at remembering words? (RSCS-Competence; YRMQ- Efficacy)

Can you work out sounds in words? (RSCS-Competence)

Is it easy for you to read new words?

Are you good at correcting mistakes in reading? (RSCS-Competence)

Do you learn things quickly in reading? (RSCS-Competence)

Can you work out sounds in words? (RSCS-Competence)
Can you work out hard words by yourself when you read? (RSCS-Competence; YRMQ-Efficacy)

Do you like to read books by yourself (MMRP- Self-Concept)

What kind of reader are you? (MMRP- Self-Concept)

How do you feel about reading? (MMRP- Self-Concept)

For me reading is (MMRP-Self-Concept)

I would say I read a lot (ABLE)

When I have questions about something I have read, I know the answers (ABLE-belief)

When I am reading something myself, I know what it is about (ABLE-belief)

I read in school to get my work done (ABLE)

Social
I visit the library often with my family (MRQ-Social)
*I often read to my brother or my sister (MRQ-Social)
My friends and I like to trade things to read (MRQ-Social)
*I sometimes read to my parents (MRQ-Social)
*I talk to my friends about what I am reading (MRQ-Social)
I like to help my friends with their schoolwork in reading (MRQ-Social)
*I like to tell my family about what I am reading (MRQ-Social)
How do you feel when you read out loud to someone? (MMRP-LLO)
Do you tell your friends about books you read? (MMRP-LLO)
When someone reads out loud to me, I think it is (MMRP-LLO)
Do you like to read books out loud to someone else? (MMRP-LLO)
How do you feel when you are in a group talking about books? (MMRP-LLO)
I read because other people say it is important (RMQ-Social)
I read because I know that my friends also read a lot (RMQ-Social)
I read because one gets praise for frequent reading (RMQ-Social)
I read because I like it when other people think I am a diligent reader (RMQ-Social)
I read because my parents think it is important that I read a lot (RMQ-Social)
I read because I want my parents to be proud of me (RMQ-Social)

Notes. *Indicates item in KRMS. Appendix A lists all existing reading motivation scales and acronyms.

Next, in consultation with literacy experts, it was decided that kindergarten students will be better able to understand and respond to items in question format rather than statement form. Thus, all selected items either remained or were converted to question form. Other rephrasing of items may have occurred for clarity and brevity purposes, and to ensure the items lent themselves to reliable responses from young students.

All items from scales that did not attempt to measure the four subdomains (enjoyment, value, perceived competence, and social motivation, but attempted to more generally measure reading motivation were also analyzed for content quality, construct-relevance, and developmental appropriateness. Two items from the Emerging Reader Motivation Scale (ERMS) (Zheng et al., 2016) were chosen for inclusion in the KRMS. After examining all existing items, my research team and I created four additional items we believed are developmentally appropriate and construct-relevant. Table H.1 in Appendix H shows the final items selected and their source, as well as the newly created items developed for KRMS.[8]

In addition to the items intended to measure reading motivation, a few exploratory questions were included. Questions about access to books at school and at home were added. Two additional qualitative questions were also added to ask about reading experiences and particular reading interests. All exploratory questions that were administered alongside KRMS can be found at the end of Table I.1 in Appendix I, but are *not* part of the validation process.

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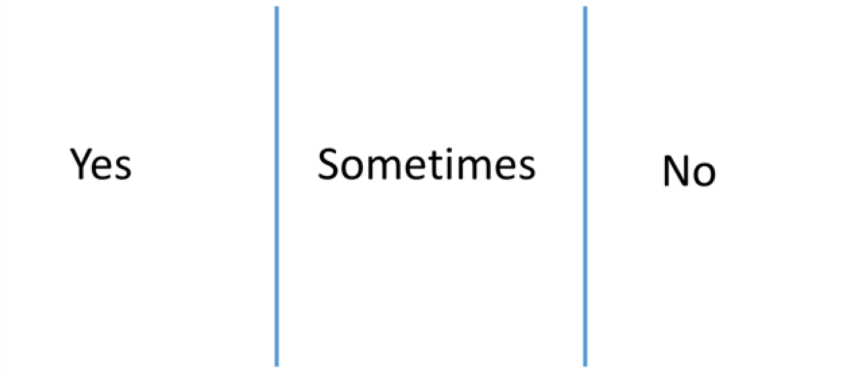
[8] **APA Standard 4.7:** The procedures used to develop, review, and try out items and to select items from the pool should be documented.

Pilot studies.

After selecting and developing new items for the KRMS, two pilot studies were conducted. Both pilots took place at one public school in northeast Philadelphia, the same region where the final administration took place in March and April 2017[9]. However, students who participated in the pilot studies were not part of the final administration. A minimum of 30 students were selected for each pilot as recommended by Johanson and Brooks (2009) for pilot studies on preliminary scale development.

The first pilot primarily tested which response method would elicit the most variation and valid responses from kindergarten students. Forty-seven (47) kindergarten students were randomly selected. Three response methods were administered. The first five students were presented with a visual aid (Figure 5) that had three words: yes, sometimes, and no.

Figure 5. Visual Aid with Words



[9] **APA Standard 4.9:** When an item or test form tryouts are conducted the procedures used to select the sample of test takers as well as the resulting characteristics of the sample should be documented. The sample should be as representative as possible of the population for which the test is intended.

None of the five students referred to the visual aid during the administration of the pilot scale. Instead students verbally answered "yes, no, or sometimes." This method was ceased after the fifth student because they were not using the visual aid. The next 30 students were presented with a visual aid that, in addition to words (yes, sometimes, no), also had pictures of thumbs as displayed below in Figure 6:

Figure 6. Thumbs Response Method

Students were instructed to use the visual aid or their own thumbs. The majority of students did not use their own thumbs or the visual aid. Consequently, with the final twelve students from the pilot study the assessment was next administered as a conversation. Students were verbally given the options "yes or no." However, if a student answered yes, s/he would be further probed by the assessor (e.g. "Do you like to read? Yes, A *little* or a *lot*?)

Results from the first pilot revealed that more response variation occurred using the conversation method rather than the visual thumb method. For example, when the question "Do you like to read?" was asked with a thumb visual aid, 9 percent responded "no," 12 percent responded "sometimes," and 89 percent responded "yes." In contrast, when asked as a conversation with further probing, 8 percent responded "no," 42 percent

responded "yes: a little," and 50 percent responded "yes: a lot." Additionally, results from the first pilot also identified three questions where students appeared to hesitate or looked confused; these were reworded for clarity.

A second pilot tested wording of items, and consisted of fewer students (n = 30). This pilot was administered using the conversation response method *only* in which students were further probed if s/he responded yes to a question (e.g. "Do you like to read a little or a lot?"). Per observations from the first pilot, distractor questions were added to prevent students from automatically answering "yes" to every item (e.g. "Do you have a pet dinosaur?"). These questions were strategically placed so that students would likely be forced to respond "no" and think about the question. Results from this pilot indicated that students lose focus if a question is too long. Thus, many questions were shortened to include as few words as possible, and some questions were divided into shorter questions. Three items were dropped because students either appeared confused or more than 90 percent answered "yes." The final instrument can be found in Table I.1 in Appendix I; however, Table H provides a clear list of all the items without including assessor instructions.[10]

[10] **APA Standard 4.2:** The test specifications should define the content of the test, the proposed length, the item formats, the desired psychometric properties of the test items and the test, and the ordering of items and sections. Test specifications should also specify the amount of time allowed for testing; directions for test takers; procedures to be used for test administration, including permissible variations; any materials to be used; and scoring and reporting procedures.

Sample and Data

This study collected multiple forms of data. Students complete the KRMS, three reading sections of the WRMT, and two math sections of the Kaufmann Test of Educational Achievement, and teachers rated students' reading motivation. Data collection took place at all 12 schools that participated in the Zoology One efficacy evaluation. The schools were located in Northeast Philadelphia, and had a diverse student body.

In March 2017, trained assessors individually administered and scored the KRMS to 951 kindergarten students. KRMS administration time ranged between three and five minutes per student, though there was no time limit. The scale is relatively straightforward and simply required assessors to converse with children about reading (see Table I.1 in Appendix I for scoring instructions). Assessors were selected based on relevant experience working with young children. They attended a one-hour training where assessors practiced administering and scoring the scale.[11]

One month later, the same assessors also administered the Woodcock Johnson Reading Mastery test (WRMT) to the same students. The following sections of the WRMT were used in this study: Word Identification (ID), Word Comprehension, and

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[11] **Standard 4.18:** Procedures for scoring and, if relevant, scoring criteria, should be presented by the test developer with sufficient detail and clarity to maximize the accuracy of scoring. Instructions for using rating scores or deriving scores obtained by coding, scaling, or classifying constructed responses should be clear.
Standard 4.20: The process for selecting, training, qualifying and monitoring scorers should be specified by test developer. The training materials, such as scoring rubrics and examples of test takers' responses that illustrate the level on the rubric score scale, and the procedures for training scorers will result in a degree of accuracy and agreement among scorers that allows scores to be interpreted as originally intended by test developer.

Passage Comprehension (Woodcock, 2011). These three WRMT sections were used since there is no composite measure. In the Word ID section, children read a list of words aloud; after five seconds students are prompted to move to the next word. Word Comprehension asks students to provide synonyms, antonyms, and analogies; after fifteen seconds students are prompted to move to the next word. Passage comprehension requires children to read passages to themselves and fill in the blanks in a sentence; a child has about thirty seconds after reading the passage to respond (Woodcock, 2011).

In June 2017, the same assessors also administered the Kaufman Test of Education Achievement in math computation and math concepts and applications. However, due to time and resource constraints fewer students were randomly selected to participate (n = 359).

Teachers' responses were also part of the data collection. All teachers in the study were asked the following question for each of their students: "On a scale of 1 to 5 (5 being the highest), how motivated is this student to read?" Teacher responses were recorded for 764 students. It is important to take note of the fact that the question above was asked in June/July 2017, while students completed KRMS in March 2017.

Missing data.

There were 951 student observations of the KRMS data (considered overall sample). There was complete matching data for both KRMS and WRMT for 878 students, a decrease of almost eight percentage points from the overall sample. There was incomplete/missing data for WRMT and KRMS scores when students only completed the KRMS and *not* the WRMT. Although there was a small percentage of missing data,

Table 17 shows KRMS scores for the analytic sample and the sample with missing WRMT data.

Table 17. Kindergarten Reading Motivation Scale (KRMS) Scores for Analytical Sample and Missing Data

	Analytic Sample		Missing Woodcock Reading Mastery Test (WRMT) Sample	
	Mean	Standard Deviation	Mean	Standard Deviation
KRMS Scores	2.47	.33	2.45	.35
	n = 878		n =41	

Source: Unpublished data from the IES Zoology One efficacy evaluation (Institute of Education Sciences, n.d.)

For Kaufman Math there was matching data for 352 out of the 359 students who completed both the Kaufman Math exam and the KRMS; only seven KRMS observations were missing math scores. There were 760 matching scores for student KRMS scores and teacher rating reading motivation scores; only four observations were missing.

Methods and Analyses

Before validating the KRMS, each item was analyzed to determine its statistical properties (mean and standard deviation). Average KRMS scores were calculated by taking a simple average of all 19 items; each item's score and the KRMS overall average range between 1 and 3. This study examined the KRMS's reliability and validity.[12] Table 18 below explains the different types of validity assessed in this study (Ary et al., 2013).

[12] **APA Standard 4.10:** When a test developer evaluates the psychometric properties of items, the model used for that purpose should be documented.

Table 18. Types of Validity

Validity	Description
Criterion-concurrent Validity	The relationship between measure and outcome; it can be concurrent or predictive.
Construct related Validity	The scale measures what it was designed to measure.
Convergent Validity	Measures that theoretically should be related, are related.
Divergent Validity	Measures that theoretically should NOT be related, are not related.

Criterion-concurrent validity.

To establish criterion-concurrent validity, the bivariate correlation between WRMT and KRMS was explored. Pairwise correlations were calculated. To correct for multiple comparisons and keep a family-wise error rate at .05, a Bonferroni adjustment was used. The Bonferroni correction tests uses an adjusted threshold for judging statistical significance that is equal to "α/m" rather than α, where α is the significance level (.05) and m is the number of hypotheses tests (Dunn, 1961). The following correlations were examined:

- Item Analyses:
    - WRMT Word ID ~ Each individual item score of KRMS
    - WRMT Word Comprehension ~ Each individual item score of KRMS
    - WRMT Passage Comprehension ~ Each individual item score of KRMS
- Full Scale Analyses:
    - WRMT Word ID~ Average score on KRMS
    - WRMT Word Comprehension ~ Average score on KRMS

- WRMT Passage Comprehension ~ Average score on KRMS

Construct-related validity. [13]

The item-total correlation approach allows a scale to be constructed by identifying groups of items that can be combined together into one scale. This approach allows items to vary together, and allows no individual item to be weakly related to the average of the other items (Churchill, 1979). Correlations were calculated between each individual item and the overall score. A small item-correlation indicates that an item is not measuring the same construct as the other items. For example, correlations below .2 indicate that the item does not correlate well with the scale and should be dropped (Everitt, 2002, and Field, 2005).

Preliminary tests were run to examine the internal structure of the scale. A scree plot, Very Simple Structure (VSS) criterion, and Minimum Average Partial (MAP) criterion were used to explore how many factors are in the internal structure of KRMS. A scree plot is a line segment that displays the fraction of total variance represented by both principal component analysis and factor analysis. The horizontal axis displays number of factors and the vertical axis shows eigenvalues. All scree plots show a line segment that has a downward curve, and the largest drop or break indicates the number of factors that should be expected (Revelle, 2017). VSS is a goodness of fit test for factor solutions. The number of factors that maximize the VSS criterion is considered the optimal number of factors (Revelle and Rocklin, 1979). The MAP criterion conducts principle component analysis followed by an analysis of the matrices of partial correlations (Velicer, 1976).

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[13] **APA Standard 4.12:** Test developers should document the extent to which the content domain of a test represents the domain defined in the test specifications.

Through this approach factors are retained if the variance in the correlation matrix is systematic as opposed to error variance (Velicer, 1976).

After preliminary checks on the internal structure, I conducted exploratory factor analysis (EFA) to examine the underlying relationships of the latent construct theorized, reading motivation (Fabrigar, Wegener, MacCallum, & Strahan, 1999). Maximum likelihood estimation was an optimal choice when data is normally distributed (Fabrigar et al., 1999), and promax rotation is recommended when doing EFA (Revelle, 2017).

I used McDonald's (1999) omega as an estimate of general factor saturation. This was appropriate because I hypothesized that reading motivation is one general construct with two subdomains. Omega is a hierarchical coefficient, which means that, in addition to the general factor saturation test, it conducts factor analysis to examine if there are subgroups within that factor. Omega was calculated by conducting principal axis factor analysis to the original dataset, rotating the factors using a promax rotation method, and a transformation of higher order factor analysis (Revelle, 2017).

Convergent validity.

All teachers were asked "How motivated to read is [insert name]?". This question is intended to serve as a check for convergent validity between teachers' response and KRMS score. Although it would have been optimal for convergent validity to ask teachers the same questions as on the KRMS, this was not possible due to resource constraints and a burden on teachers' time. Nonetheless, a moderate correlation between the question and the KRMS should be expected. To establish convergent validity (Ary et al., 2013), a Pearson correlation was used to correlate teacher students' score and students' KRMS score.

Discriminant validity.

Discriminant validity was calculated by using a Pearson correlation to examine the correlation of the Kaufmann math scores and KRMS scores. Zero or near zero correlations would indicate discriminant validity (Ary et al., 2013). As a robustness check, correlations were calculated between distractor questions and KRMS scores.

Reliability.

Reliability was checked to ensure the internal consistency of the KRMS. Overall Cronbach's alpha was calculated from the pairwise correlations between items using the following formula (Knapp, 1991):

$$\alpha = \frac{N\ (Mean\ r)}{1 + Mean\ r\ (N - 1)}$$

where,

α = Cronbach Alpha

N = the number of items

Mean *r* = mean interitem correlation

The following common rule of thumb was used (George and Mallery, 2003): above .9 (excellent), between .8-.9 (good), .7-.8 (acceptable), .6-.7 (questionable), .5-.6 poor, and below .5 (unacceptable).

Results

All 19 items on the KRMS hold together with high inter-item correlations. Only nine KRMS items were positively correlated with WRMT sections. Tests of internal structure suggest the scales were either comprised of one or two factors. Reliability was high for KRMS **α** = .80.

Criterion-concurrent validity.

Not all items on the KRMS were correlated with WRMT section reading achievement scores, however, nine items were positively correlated and four of those items were statistically significant ($p < .05$). Table 19 shows each item and its correlation with each WRMT section. Out of the nine questions with positive (not necessarily significant) correlations, six items were about perceived-competence (e.g. “Is reading by yourself hard?” and “Can you read as many words as other kids in your class?”) and help answer the question “Can I be a good reader?” The other three items with positive correlations were about reading interest (e.g. “Do you like to read?” and “Do you like it when the teacher reads stories?” and help answer the question “Do I want to be a good reader?”

Table 19. Item Analysis of Kindergarten Reading Motivation Scale (KRMS): Correlations with Woodcock Reading Mastery Test Subscales of Word Identification, Word Comprehension, and Passage Comprehension

	WRMT Subscale		
KRMS Item	Word ID	Word Comprehension	Passage Comprehension
Do you like to read?	**.10**	**.09**	**.09**
Do you like it when someone reads to you?	-.05	-.04	-.01
Can you learn new things from books?	.00	-.07	-.03
Do you like to look at books by yourself?	.00	-.03	-.02
Do you like to go to your classroom reading area?	-.05	-.09	-.06
Would you like it if someone gave you a book?	.00	.00	.02
Do you like to read books with your teacher?	-.03	-.03	-.01
Is reading by yourself hard?	**.16*** **	**.13***	**.14****
Do you like to talk to people about books you read?	-.09	-.12	-.10
Is reading in school boring?	**.06**	**.04**	**.09**
Can you read as many words as other kids in your class?	**.15****	**.12**	**.12^{+}**
Is there someone you like to read books with?	-.03	-.07	-.04

Are there books in your classroom that you can read all by yourself?	**.10**	**.11**	**13***
Are you a good reader?	**.18*** **	**.14***	**.15****
Can you use books to find answers to questions	-.04	-.07	-.06
Can you help other kids with reading?	**.05**	**.01**	**.06**
Do you like it when your teacher reads stories?	**.05**	**.02**	**.04**
Can you answer questions about the stories your teacher reads?	-.03	-.03	-.04
Can you retell stories?	**.04**	**.02**	**.03**

n = 878
Source: Unpublished data from the IES Zoology One efficacy evaluation (Institute of Education Sciences, n.d.)

Table 20 shows the correlation between the simple average of KRMS scores and WRMT sections. Average KRMS scores had a small positive non-significant correlation with the WRMT Word ID and WRMT Passage Comprehensions, and no correlation with the WRMT Word Comprehension section.

Table 20. Correlation Between Average KRMS Scores and WRMT Sections

	Average KRMS Scores
WRMT: Word ID	.06
WRMT: Word Comprehension	.00
WRMT: Passage Comprehension	.06

n = 878

Source: Unpublished data from the IES Zoology One efficacy evaluation (Institute of Education Sciences, n.d.)Note: *** p < .001Source: Unpublished data from the IES Zoology One efficacy evaluation (Institute of Education Sciences, n.d.)

Construct-related validity.

Inter-item correlations were calculated for all items of the KRMS. All items yielded adequate inter-item correlations above .2, indicating that each item of the KRMS was correlated with the average of the other items in the scale. Thus, the items hold together.

All items had means close to the maximum score, 3. Table 21 also shows each item mean and standard deviation. The four items with the highest means were items that ask about "liking to read" with other people ("Would you like it if someone gave you a book?", "Is there someone you like to read books with?", "Do you like it when your teacher reads stories?", and "Do you like to read books with your teacher?"). These four items yielded minimal variation and this is likely why they were not highly correlated with the WRMT reading sections. The four items with the lowest means are items about perceived competence ("Is reading by yourself hard?", "Can you read as words as other kids in your class", "Can you retell stories", and "Can you use books to find answers to questions?"). These items yielded more variation, two of the four items were statistically significantly correlated with the WRMT, and the other two were positively correlated with the WRMT.

Table 21. Item Analysis: Inter-item Correlations, Means and Standard Deviation for Items in Kindergarten Reading Motivation Scale (KRMS)

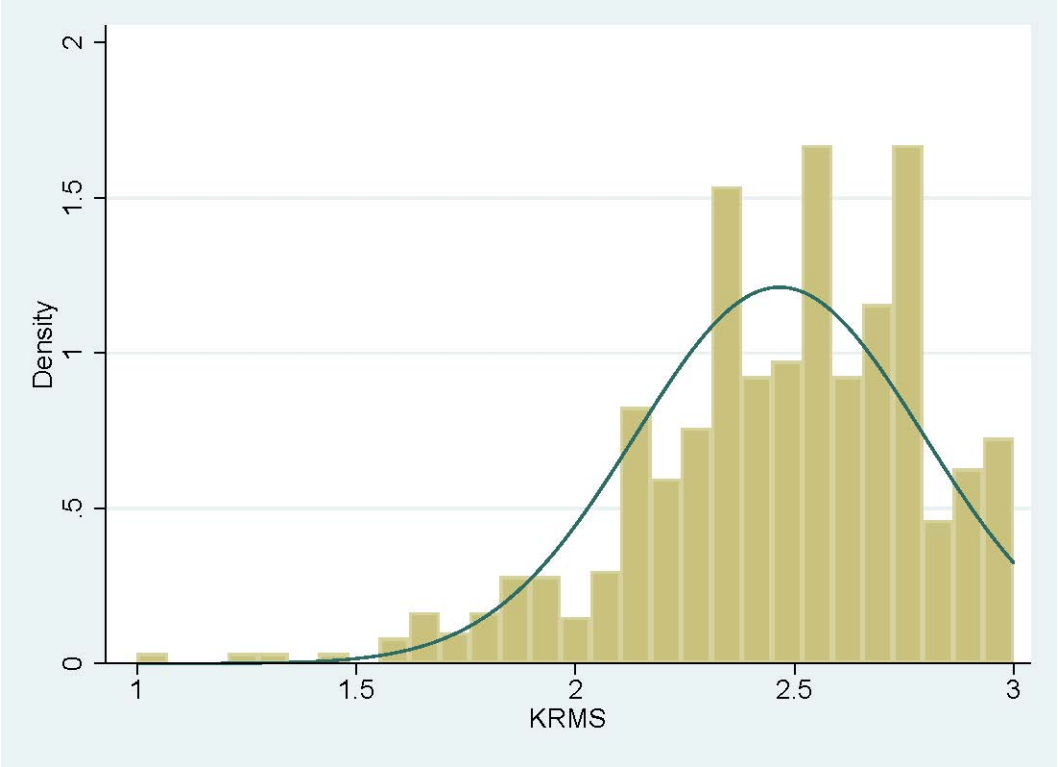
KRMS Item	Inter-item Correlation	Mean	Standard Deviation
Do you like to read?	0.56	2.57	0.62
Do you like it when someone reads to you?	0.21	2.52	0.70
Can you learn new things from books?	0.44	2.50	0.60
Do you like to look at books by yourself?	0.37	2.43	0.75
Do you like to go to your classroom reading area?	0.45	2.56	0.69
Would you like it if someone gave you a book?	0.48	2.70	0.57
Do you like to read books with your teacher?	0.43	2.69	0.59
Is reading by yourself hard?	0.41	2.16	0.86
Do you like to talk to people about books you read?	0.49	2.39	0.75
Is reading in school boring?	0.39	2.59	0.72
Can you read as many words as other kids in your class?	0.57	2.25	0.79
Is there someone you like to read books with?	0.43	2.72	0.62
Are there books in your classroom that you can read all by yourself?	0.55	2.35	0.72

Are you a good reader?	0.57	2.45	0.67
Can you use books to find answers to questions	0.55	2.33	0.7
Can you help other kids with reading?	0.58	2.55	0.66
Do you like it when your teacher reads stories?	0.41	2.78	0.48
Can you answer questions about the stories your teacher reads?	0.55	2.33	0.71
Can you retell stories?	0.52	2.08	0.80

n = 878
Source: Unpublished data from the IES Zoology One efficacy evaluation (Institute of Education Sciences, n.d.)

Figures 7 below shows the distribution of the average scores for KRMS. The distribution is slightly positively skewed. However, it has a normal density, and closely resembles a normal distribution. The mean score is 2.47 (standard deviation: .33).

Figure 7. Kindergarten Reading Motivation Scale (KRMS) Average Score Distribution

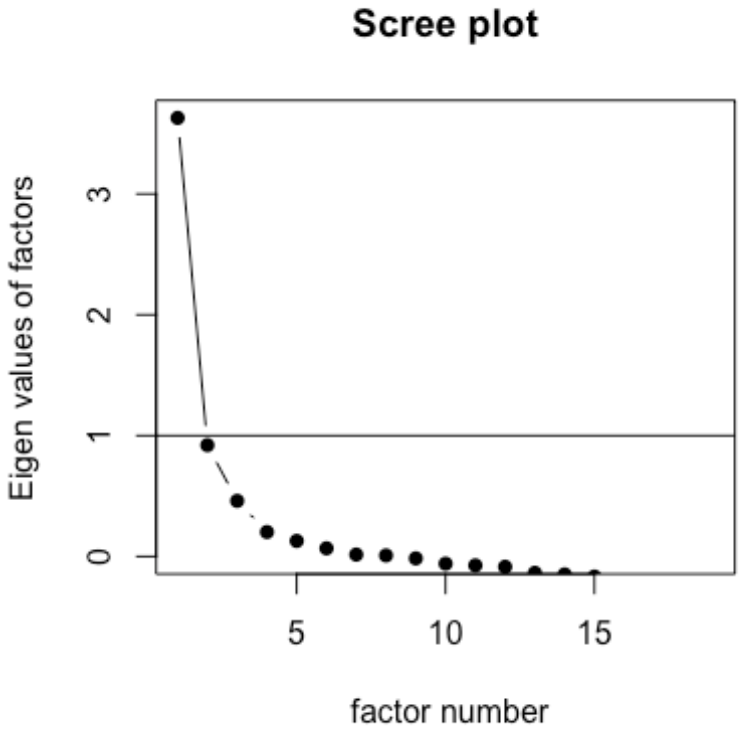


n = 878

Source: Unpublished data from the IES Zoology One efficacy evaluation (Institute of Education Sciences, n.d.)

The scree plot uses factor analysis to display Eigen values and factors. Figure 8 below suggests that KRMS consists of two factors; one with an Eigen value above three and another with an Eigen value of about one. However, given that one Eigen value was slightly below one and the other is much larger (above three), this raises the possibility that a one-factor solution might be appropriate.

Figure 8. Kindergarten Reading Motivation Scale (KRMS) Scree Plot



Source: Unpublished data from the IES Zoology One efficacy evaluation (Institute of Education Sciences, n.d.)

The VSS and MAP criterion results diverged, but oscillate between one and two factors. The VSS criterion indicated one factor, while the MAP criterion indicated two factors.

Exploratory factor analysis was first conducted with an unrestricted factor solution. Table 22 below shows the factor loadings for the first two factors because most items load on those factors. Following recommendations for best practices of early exploratory factor loading (Costello & Osborne, 2005; Tabachnick & Fidell, 2001) all item loadings above .3 are in bold. Items that load on factor 1 were mostly about perceived competence (e.g. Is reading by yourself hard, Are you a good reader), while items that load on factor 2 were mostly about reading enjoyment (e.g. Do you like it

when someone reads to you, Do you like it when your teacher reads stories). Five items did not load on either factor. Table 22 shows no item overlap suggesting that there are two distinct factors.

Table 22. Exploratory Factor Analysis with an Unrestricted Factor Solution: Kindergarten Reading Motivation Scale (KRMS) Items' Factor Loadings

KRMS Items	Factor 1	Factor 2
Do you like to read?	**0.39**	0.22
Do you like it when someone reads to you?	-0.09	**0.34**
Can you learn new things from books?	0.21	0.13
Do you like to look at books by yourself?	0.22	0.08
Do you like to go to your classroom reading area?	0.18	0.20
Would you like it if someone gave you a book?	0.13	**0.43**
Do you like to read books with your teacher?	0.07	**0.42**
Is reading by yourself hard?	**0.39**	-.07
Do you like to talk to people about books you read?	0.15	**0.43**
Is reading in school boring?	0.07	0.16
Can you read as many words as other kids in your class?	**0.59**	0.08

Is there someone you like to read books with?	0.13	**0.54**
Are there books in your classroom that you can read all by yourself?	**0.59**	0.04
Are you a good reader?	**0.65**	0.08
Can you use books to find answers to questions	0.28	0.19
Can you help other kids with reading?	**0.46**	0.22
Do you like it when your teacher reads stories?	0.11	**0.42**
Can you answer questions about the stories your teacher reads?	0.29	0.16
Can you retell stories?	**0.34**	0.05

n = 878

Source: Unpublished data from the IES Zoology One efficacy evaluation (Institute of Education Sciences, n.d.)

Given the above exploratory factor analysis results in addition to the scree plot, VSS criterion, and MAP criterion, exploratory factor analysis was now restricted to two factors. Table 23 below shows the factor loadings with a two-factor solution. Unlike the unlimited factor solution, most items that loaded above .3 in factor 2 overlap with factor 1. The two factors had a high correlation of .76 suggesting that there may be not be two distinct sub-constructs.

Table 23. Exploratory Factor Analysis with a Two Factor Solution: Kindergarten Reading Motivation Scale (KRMS) Items' Factor Loadings

KRMS Items	Factor 1	Factor 2
Do you like to read?	**0.52**	-.01
Do you like it when someone reads to you?	0.08	**0.36**
Can you learn new things from books?	**0.39**	0.03
Do you like to look at books by yourself?	0.26	-.02
Do you like to go to your classroom reading area?	**0.35**	.11
Would you like it if someone gave you a book?	**0.40**	**0.31**
Do you like to read books with your teacher?	**0.33**	**0.37**
Is reading by yourself hard?	**0.35**	-.27
Do you like to talk to people about books you read?	**0.40**	**0.30**
Is reading in school boring?	0.27	0.10
Can you read as many words as other kids in your class?	**0.57**	0.26
Is there someone you like to read books with?	**0.37**	**0.38**
Are there books in your classroom that you can read all by yourself?	**0.55**	-.28

Are you a good reader?	**0.60**	-.28
Can you use books to find answers to questions	**0.49**	0.05
Can you help other kids with reading?	**0.56**	-0.06
Do you like it when your teacher reads stories?	**0.35**	**0.33**
Can you answer questions about the stories your teacher reads?	**0.48**	0.04
Can you retell stories?	**0.46**	-.10

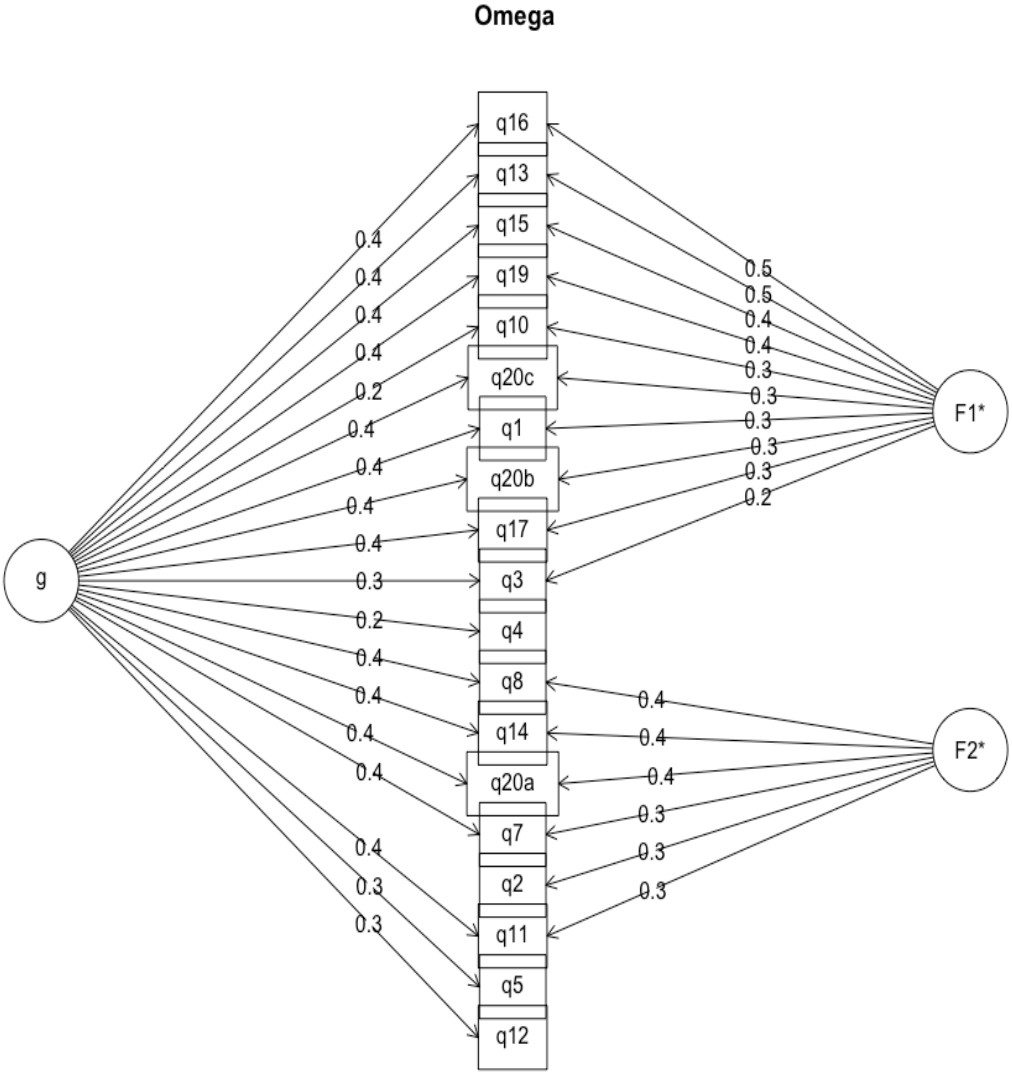
n = 878

Source: Unpublished data from the IES Zoology One efficacy evaluation (Institute of Education Sciences, n.d.)

Like exploratory factor analysis, the omega exploratory hierarchical analysis was restricted to two equal factors (bi-factor analyses) and used the promax rotation as recommended by Revelle (2017) for exploratory factor analysis. Figure 11 below shows the results and suggests that there is one weak overall hierarchical factor, as well as two subdomains. All items loaded onto a general factor, ω-hierarchical = .56 which describes the general factor saturation of the scale and explains the amount of variance accounted by the general factor. Most items loaded on two factors, except three ("Do you like to look at books by yourself?", "Do you like to go to your classroom reading place?", and "Is reading time in school boring?"); these three items also did not load on either factor 1 or 2 in exploratory factor analysis (unrestricted). Similarly, to the above results using exploratory factor analysis (unrestricted), factor 1 consisted of questions that are mostly about perceived competence (See Table 24), which help answer the question "Can I be a

good reader?" While factor 2 consistsed of questions that are mostly about reading enjoyment, which help answer the question "Do I want to be a good reader?".

Figure 9. Kindergarten Reading Motivation Scale (KRMS) Omega Hierarchical Results



n = 878
Source: Unpublished data from the IES Zoology One efficacy evaluation (Institute of Education Sciences, n.d.)

Table 24. Kindergarten Reading Motivation Scale (KRMS) Omega Results: Two Factor Solution

Factor 1
1. Do you like to read?
3. Can you learn new things from books?
10. Is reading by yourself hard?
13. Can you read as many words as other kids in your class?
15. Are there books in our class that you can read by yourself?
16. Are you a good reader?
17. Can you use books to find answers to questions?
19. Can you help other kids with reading?
20b. Can you answer questions about the stories your teacher reads?
20c. Can you retell stories?
Factor 2
2. Do you like it when someone reads to you?
7. Would you like it if someone gave you a book?
8. Do you like to read books with your teacher?
11. Do you like to talk to people about the books you read?
14. Is there someone you like to read books with?
20a. Do you like it when your teacher reads stories to the class?

n = 878
Source: Unpublished data from the IES Zoology One efficacy evaluation (Institute of Education Sciences, n.d.)

A sensitivity check was done using three instead of two factors during the omega exploratory factor analysis. Table J.1 in Appendix J shows the results. Questions still only loaded onto two factors even when the omega analysis used three factors, thus supporting the judgement that two factors was an appropriate choice.

Convergent and discriminant validity.

Teachers' ratings of student reading motivation were not correlated with average KRMS scores (see Table 24). The mean of the teacher student reading motivation score was 4.05 (on a 1-5 scale) with a standard deviation of 1.08, indicating a positive skew and minimal variation in the item.

Both math Kaufman scores (computation and concepts) were uncorrelated with KRMS scores (see Table 25). As a robustness check, the correlations of the distractor items with KRMS were checked, and also reveal near zero correlations (see Table 25).

Table 25. Correlations between Kindergarten Reading Motivation Scale (KRMS) & Teacher Reading Motivation Rating, KRMS & Kaufman Math, and KRMS & Distractor Questions

	KRMS Average Score	Sample Size
Teacher Reading Motivation Rating	-.04	n = 760
Math Computation	-.12	n = 352
Math Concepts	-.02	
Distractor Question: Do you like stinky cheese?	.01	n = 878
Distractor Question Do you have a pet dinosaur?	.05	

Source: Unpublished data from the IES Zoology One efficacy evaluation (Institute of Education Sciences, n.d.)

Reliability.

Cronbach alpha for the overall KRMS was high, **α** = .80. More items increase the reliability of a scale (Drost, 2011), thus, KRMS with 19 items had a high and acceptable reliability.

Limitations

As mentioned in the previous chapters, precision is an issue to consider when attempting to measure a theoretical, psychological construct like reading motivation (Fulmer and Frijters, 2009). Like the Self-Description Questionnaire (SDQ) Reading subscale analyzed in the previous chapter, the KRMS is also susceptible to self-assessment, reference, and social-desirability bias (West et al., 2013). Additionally, analysis of the instrument consists of a sample of kindergarten students in Northeast Philadelphia, and thus inherently limits its external validity.

Scale developers have varied purposes for their scales, as well as different conceptualizations of reading motivation. The use of the reading motivation instrument in this validation study requires using the scale for the purpose of either research and/or instruction; reading motivation could be assessed as either a mediator/outcome measure and/or for formative assessment. Additionally, using KRMS requires the assumption that reading motivation can be conceptualized using Eccles and Wigfield's (2002) two question framework: "Can I be a good reader" and "Do I want to be a good reader?"

Discussion

Using a conventional measure of reliability, Cronbach's alpha, KRMS is a reliable instrument. However, KRMS is not strongly correlated with reading achievement. Other studies have found similar small correlations (Schiefele et al., 2012), including the results from the study in chapter three. Scholars suggest that this finding is typical of young students because of developmental dynamics, and as students grow older

the correlation between reading motivation and reading achievement increases (Morgan & Fuchs, 2007).

The initial hypothesis that reading motivation for young students is composed of one general construct rather than multiple subdomains is partially supported. Multiple results indicate that KRMS has one general weak factor, as well as two subdomains that may overlap. The second factor in KRMS consists of questions about students' reading interest/enjoyment with others (all five questions are about reading with others) and help answer the question "Do I want to be a good reader?" These questions were not correlated with WRMT. It may be that young students do not necessarily like reading, but responded positively because they like spending time with other people.

The first factor in KRMS consists of questions about a students' perceived competencies and help answer the question "Do I want to be a good reader?" These questions had the highest (and significant) correlations with reading achievement. Results indicate that it is possible for students as young as five and six years old to be self-aware of their own competencies and competencies in comparison to others. This can likely be attributed to the data and goal-centered culture that exists in schools today. Students are encouraged to track their progress and set goals. Since this study is nested within an efficacy evaluation of Zoology One, a kindergarten reading curriculum, half of the sample participated in Zoology One. The curriculum encourages students to track their reading progress and read with partners (American reading Company, n.d). Similarly, part of the Philadelphia Pubic Schools' general kindergarten curriculum also includes tracking reading minutes, paired reading, and other types of partner work (Philadelphia Public Schools, 2016). Thus, the wide-spread nature of these reading strategies and data-

centered culture are likely why students are aware of their own competencies, as well as the competencies of their peers even at such a young age.

KRMS scores have a low non-significant *negative* correlation with Kaufman math scores. Prior literature suggests that reading and math skills are positively correlated; with correlations range from .09 to .75 (Onatsu-Arvilommi, Nurmi & Aunola, 2002; Singer & Strasser, 2017). However, given that KRMS scores have a low positive correlation with reading achievement, zero or near zero correlations would be expected between KRMS and math achievement. Since the negative correlation is non-significant it may be a spurious result.

Surprisingly teachers' rating of each of their students' reading motivation is also weakly negatively related to KRMS scores (r = -.04). These results imply that either (1) there is not enough variation in the item, (2) teachers' perceptions of their students' learning does not match students' own self-perceptions of their learning, and/or (3) the teacher item is inaccurate because it was completed two months after students' completed the KRMS.

CHAPTER 5: IMPLICATIONS

From these studies three main implications emerge: (1) early intervention potentially could leverage students' high motivation; (2) reading motivation is a useful predictor when previous achievement is not known; (3) provides researchers and teachers with two scales to use to enhance the reading profile of their students.

Policymakers and educators should capitalize on students' early reading motivation and intervene early by creating programs that engage struggling readers. Both studies in this volume confirm that early average reading motivation is high for key subgroups of students. However, Marinak and Gambrell (2002) found that reading motivation begins to decline in second grade. Once students have negative experiences with reading, it becomes difficult to motivate them to become proficient readers (Morgan & Fuchs, 2007). This phenomenon makes it increasingly important to prevent the decline in reading achievement and implement curricula and programs that foster a reading culture and thereby increase reading motivation.

Implementing curricula and programs that aim to increase reading motivation can be effective in keeping reading motivation levels high. Students who participated in the aforementioned Zoology One curriculum self-reported reading motivation levels that were .38 standard deviations higher than those of students who did not participate in Zoology One ($p < .001$) (Gray, 2018). Additionally, all teachers who implemented Zoology One reported on an end-of-year survey that their students were more engaged than in previous years when they were using other curricula (Gray, 2018). Other programs and curricula exist that aim to increase reading motivation, these and a list of instruction strategies are listed in Table 3 in chapter two.

Although it is likely not beneficial to collect and track early student motivation data at the state or district-level (summativley), it can be used formatively by teachers who need a quick (low-stakes) assessment of a student's reading profile, especially if previous achievement is unknown. Nonetheless, after controlling for background characteristics (excluding previous reading achievement), on average moving students one standard deviation on the third reading motivation scale is associated with an average increase of .18-.19 standard deviations in 5th grade reading achievement. Given that students' reading motivation is skewed left with a mean of 3.30 (standard deviation: .66) on a 1-4 scale, moving one standard deviation equates to moving a student to the maximum score on the reading motivation scale. In practice, this means that a student will answer all six reading motivation statements with a response of "very true" instead of their former response of "somewhat true." Educators should be aware that this small boost in motivation may also result in similarly small benefits in future reading achievement. Additionally, if educators would like to measure their third-grade students' motivation levels, the scale takes about one minute to administer and can be done in a whole-group setting. Further research is needed to determine the actual feasibility and practicality of moving students from responding "somewhat true" to "very true."

For policy context and implications, it is important to compare reading motivation's predictive power to that of other prominent education predictors. The reading motivation scale is easier and faster to administer than other education tests, but explains much less variation in later achievement than the well-known Intelligence Quotient (IQ) and SAT exam. In this study, the reading motivation scale takes about one minute to administer, while the IQ and SAT exams require multiple hours. Compared to

SDQ-reading subscale (third-grade reading motivation), which explains between three and five percent of the variation in later achievement (Model 1), IQ alone explains between 10 and 25 percent of later achievement (Mackintosh, 2011; Sternberg, Grigorenko, & Bundy, 2001). Similarly, the SAT alone explains between 18 and 24 percent of the variance in first-year college grades (Rothstein, 2004; Shaw, Kobrin, Patterson, & Mattern, 2012).

This study provides research on two reading motivation instruments that teachers, researchers, and other stakeholders can use to measure and track kindergarten students' reading motivation. Researchers can use self-report scale when exploring intermediate outcomes or mediators of reading achievement. Teachers can use self-report scales to enhance the reading profile of a student or simply use the scales to start a conversation and/or build a relationship with a new student. Teachers can also use reading motivation scales to dispel any preconceived biases they may have of students of color.

Future research should continue to explore self-report reading motivation levels while also tracking them longitudinally. Understanding at which point in an individual's life is his/her self-report reading motivation more predictive of later-life outcomes can be useful for policymakers. Additionally, future research should focus on exploring alternative methods to measure non-cognitive skills. Although low correlations exist for young students between self-report reading motivation and reading achievement, it may be possible that higher correlations exist when measuring reading motivation using alternative methods. However, researchers should be mindful, and create tools that are easily accessible, quick, and practical for wide-spread use.

APPENDICES

Appendix A: Table A.1 Scales that Measure Reading Motivation in Elementary-School Students

Instrument	Sample	Reliability	Validity	Constructs measured
Access to books, Beliefs, and Literacy Environment (ABLE) (Stack, Moorefield-Lang, & Barksdale, 2015)	145 students in grades 2nd-5th at one urban elementary school. 59% Black, 11% White, 11% Hispanic, 6% American Indian and 2% Asian	n/a	Factor analysis resulted in a four factor solution	access to Books, Self-efficacy, Literacy Environment, and negative attitudes as a reader
Book Reading Motivation Scale (Katranci, 2015)	579 4th - 6th grade students in Turkey	Internal consistency .75-85	Exploratory and Confirmatory Analysis, two factors were confirmed. Factor loadings for love of reading range from .48-.74 and reasons for reading range form .48-.65	love of reading and reasons for reading
Children's Academic Intrinsic Motivation Inventory (Gottfried, 1985)	141 White middle-class children in 4th-7th grade and 260 Black and White middle class children in Grades 4th -7th	Cronbach's alpha .71	Motivation correlated with reading achievement $r=.21$ ($p<.05$), IQ $r=.39$ ($p<.001$), and teacher ratings $r=.34$ ($p<.001$)	Intrinsic motivation in reading, math, science, social studies, general academics
Children's Motivation for Reading Scale (MRS) (Baker & Scher, 2002)	65 1st graders from 6 Baltimore Public Schools	Cronbach's alpha .83	Factor loadings above .5 enjoyment, value , and competence	enjoyment, value, and perceived competence

Instrument	Sample	Reliability	Validity	Constructs measured
Early Literacy Motivation Survey (ELMS) (Wilson & Tranin, 2007)	198 first-grade students in a large district in CA. 47% White, 42% Hispanic, and 7% Black	Cronbach's alpha .87; Internal consistency .69 - .77	Criterion validity correlation between constructs and achievement r = .16-.42. Confirmatory factor analysis revealed three factors	perceived competence, self-efficacy, and internal attributions
Elementary Reading Attitude Scale (ERAS) (McKenna & Kear, 1990)	Administered to nationally rep. Sample ~18,000 children in Grades 1st-6th	Cronbach's alpha .84 for 1st	Academic subscale significantly correlated with reading ability; factor analysis	reading attitude
Emergent Readers Motivation and Reading Scale (ERMAS) (Sperling, Sherwood, &Hood, 2013)	Small city ; 16 Pre-k Students and 41 K students	n/a	Construct validity through expert analysis; scale correlated ($r = .7$, $p < .01$) with PRAS	reading motivation
Emergent Reading Motivation Scale (ERMS) (Zheng, Schwanenflu, &Rogers, 2016)	56 children from Northeast Urban Georgia Pre-K 80% White, 9% Black, 9% Asian	Cronbach's alpha .75	Content validity checked by consulting with a literacy expert and 4 Pre-K coordinators	self-concept, reading learning goals, reading performing goals
Literacy Attitude Scale (LAS) (Ozturk, Hill, & Yates, 2016)	94 five year olds from four schools in Australia	Cronbach's alpha .51	Factor analysis Loading .35-.77	literacy attitude

Instrument	Sample	Reliability	Validity	Constructs measured
Me and My Reading Profile (Marinak, Malloy, Gambrell, & Mazzoni, 2015)	899 K - 2nd grade students in 3 east coast states	Cronbach's alpha .86 to .87	Factor analysis revealed three factors	self-concept, value, and literacy out loud
Motivation for Reading and Writing Profile (MRWP) (Mata, 2011)	451 kindergartners in Portugal	Cronbach's alpha above .80	3 factors accounted for 51% of the variance. 3 factors loading each at 0.48 or above; mean loading 0.64	enjoyment, value and self-concept
Motivation for Reading Questionnaire (MRQ) (Wigfield, 1996)	Widely used in numerous studies	Cronbach's alpha .75	Factor analysis: 3 factors accounting for 59% of the variance; correlated with reading achievement	efficacy, challenge, curiosity, enjoyment, importance, recognition, grades, social, competition, work avoidance
Motivation to Read Profile-Revised (MRP-R) (Malloy, Marinak, Gambrell, & Mazzoni, 2013)	One school in VA, one in PA, and one in SC; 118 3rd graders, 104 4th graders, and 54 5th graders	Cronbach's alpha .87	Correlated with achievement and original MRP scale	self-concept and value
Preschool Reading Attitude Scale (PRAS) (Saracho, 1988)	2201 children from TX, CA, PA, MD, & VA; 3, 4, and 5 year olds	Test-retest reliability r =.95	Factor analysis resulted in 2 factor structures w/loadings >.5: General reading and Library reading	reading attitude

Instrument	Sample	Reliability	Validity	Constructs measured
Reading Motivation Questionnaire (RMQ) (Schiefele & Schaffner, 2016)	883 6th grade students in Germany	Cronbach's alpha .77-.91	Confirmatory factor analysis revealed that a 7 factor model. Moderate correlations between reading motivation dimensions and comprehension, reading amount and fluency	curiosity, involvement, grades, emotional regulation, competition, and recognition
Reading Self-Concept Scale (RSCS) (Chapman & Tunmer, 1995)	Over 1,000 children from large New Zealand provincial city. (5, 6, and & 7 year olds)	Cronbach's alpha .85	Factor loadings above .5 competence, attitude, and difficulty	Competence, attitude, difficulty,
Young Children's Academic Intrinsic Motivation Inventory (Gottfried, 1988)	107 children ages 7-9; mostly White	Cronbach's alpha .87	Factor analysis => 4-factor structure; Intrinsic reading motivation correlated w/reading achievement r =.2 ($p<.05$), grades r=.3 ($p<.001$), and teacher ratings r=.30 ($p<.01$)	Intrinsic motivation in reading, math, general academics, difficulty; self-perception of competence in reading and math
Young Reader Motivation Questionaire (YRMQ) (Guthrie & Coddington, 2009)	84 students, all but 3 were White first graders	Cronbach's alpha .70	Convergent Validity with teacher scale	perceived difficulty, self-efficacy, and reading orientation

Appendix B: Table B.1 Home Literacy Control Variables- Descriptive Statistics for Early Childhood Longitudinal Study- Kindergarten (ECLS-K) and Study of Instructional Improvement (SII)

ECLS-K

	Description	Mean	Standard Deviation	Minimum	Maximum
# of Books	Number of books in home	114.92	166.91	0	5000
Freq. Read to Child	Frequency parent reads to child in a week in 4 categories: 1. Not at all 2. Once or twice 3. 3-6 times 4. Everyday	2.50	1.08	1	4

n = 9267

SII

# of Books	Number of books in home	60.74	75.26	0	1000
Freq. Read to Child	Frequency parent reads to child in a week in 4 categories: 1. Not at all 2. Once or twice 3. 3-6 times 4. Everyday	2.71	1.03	1	4

n = 1249

Appendix B: Table B.2 Classroom Control Variables- Descriptive Statistics for Early Childhood Longitudinal Study- Kindergarten (ECLS-K) and Study of Instructional Improvement (SII)

ECLS-K

	Description	Mean	Standard Deviation	Minimum	Maximum
Class size	Number of students in a class	21.13	3.89	11	31
% Reading Below Grade Level	Number of students who are reading below third-grade level	17.5%	n.a	0	100%
% Minority Students	Percent of students in the class who are minority in 4 categories:				
	1. Less than 10% 2. 10% to less than 25% 3. 25% to less than 50% 4. 50% to less than 75%	2.66	1.53	1	5
% ELLs	Percent of students in the class who are English Language Learners (ELLs) in 5 categories:				
	1. Less than 1% 2. 1% to less than 5% 3. 5% to less than 10% 4. 10% to less than 25% 5. 25% or more	1.61	1.24	1	5
Years of Teaching Experience	Number of years classroom teacher has taught	14.90	10.15	1	35
Freq. of Reading Projects	Frequency teacher assigns reading projects during class in 4 categories:				
	1. Almost every day 2. Once or twice a week 3. Once or twice a month 4. Never of hardly ever	2.40	.80	1	4
Freq. of Mixed Ability Groups	Frequency teacher groups students *not* based on ability (daily)	2.81	.91	1	5
	1. No time 2. Half hour or less 3. About one hour				

	4. About two hours 5. 3 hours or more				
Freq. of Ability Groups	Frequency teacher groups students of same ability (weekly) in 5 categories: 1. Never 2. Less than once a week 3.Once or twice a week 4. 3 or 4 times a week 5. Daily	3.21	1.42	1	5
Time Spent on Reading	Number of minutes teacher spends teaching reading daily in 4 categories: 1. 1-30 minutes 2. 31-60 minutes 3. 61-90 minutes 4. More than 90 minutes	3.16	.81	1	4

n= 7910

Appendix C: Table C.1 Mean (Standard Deviation) Raw and Standardize Fifth-grade Reading Achievement Scores for Early Childhood Longitudinal Study- Kindergarten (ECLS-K) and Study of Instructional Improvement (SII) Datasets

	ECLS-K		SII	
	Mean Score (SD)	Z-score (SD)	Mean Score (SD)	Z-score (SD)
Overall	148.36 (26.79)	.00 (1.00)	635.22 (41.74)	0.00 (1.00)
Gender:				
Girls	150.43 (26.02)	.07 (.97)	642.48 (40.78)	.19 (.98)
Boys	146.40 (27.62)	-.07 (1.02)	626.86 (41.37)	-.19 (1.00)
Race/Ethnicity:				
White	154.84 (25.19)	.24 (.94)	654.93 (42.55)	.49 (1.02)
Black	135.04 (21.21)	-.50 (.79)	624.84 (39.54)	-.23 (.95)
Hispanic	138.97 (25.22)	-.35 (.95)	636.18 (38.22)	.04 (.92)
Other	147.99 (35.30)	-.01 (.1.32)	636.53 (39.22)	.05 (.93)

Appendix C: Table C.2 Mean (Standard Deviation) Raw and Standardize Fifth-grade Reading Achievement Scores by Income Quintile

Income Quintile	Sample Size	Fifth-grade Reading Achievement Mean Test Score (SD)	*Z* score (*p* value)
1st (bottom)	n = 1609	127.07 (23.47)	-.79 (.88)
2nd	n = 1857	141.34 (23.43)	-.26 (.87)
3rd	n =1935	149.87 (22.19)	.06 (.83)
4th	n = 2272	154.56 (25.24)	.23 (.94)
5th (top)	n = 2495	166.28 (21.68)	.67 (.81)

Appendix D: Table D.1 Model 3: Fifth-grade Reading Achievement- Estimated Relationship between Third-grade Reading Motivation and Fifth-grade Reading Achievement, Controlling for Prior Achievement, Background Characteristics, and Home Literacy Characteristics

	Early Childhood Longitudinal Study-Kindergarten (ECLS-K)		Study of Instructional Improvement (SII)	
Variable	*Beta*	SE	*Beta*	SE
Third-grade Motivation	.01	.010	.08**	.024
Third-grade Achievement	.80***	.013	.53***	.034
SES	.10***	.011	.10***	.025
Age	-.02*	.011	-.04^{+}	.025
Race (White = omitted)				
1. Black	-.12**	.038	-.32***	.086
2. Hispanic	-.01	.022	-.10	.093
3. Other	.02	.045	-.11	.098
Gender = Girl (Boy =omitted)	-.00	.020	.21***	.046
Freq. Read to Child	.00	.008	.00	.039
# of books in home	-.02*	.009	.03	.023
Adjusted R^2	.743			.410
$^{+}p < .10$; $*p < .05$; $**p < .01$; $***p < .001$	n = 9,267			n= 1,249

Appendix E: Table E.1 Model 4: Fifth-grade Reading Achievement- Estimated Relationship between SDQ- Reading Subscale and Fifth-grade Reading Achievement, Controlling for Prior Achievement, Background, Home Literacy, and Classroom Characteristics

	Early Childhood Longitudinal Study-Kindergarten (ECLS-K)	
Variable	*Beta*	SE
Third-grade Motivation	.017	.011
Third-grade Achievement	.79***	.015
SES	.09***	.013
Age	-.02*	.011
Race (White = omitted)		
1. Black	-.13**	.044
2. Hispanic	-.03	.026
3. Other	.01	.060
Gender = Girl (Boy =omitted)	-.00	.021
Freq. Read to Child	-.00	.008
# of books in home	-.02	.011
Percent Minority Students in Class	.01	.011
Percent LEP Students in Class	.01	.010
# of Students in Class	.00	.011
# of Students Reading Below Grade	-.02*	.010
Mixed Grouping	.01	.009
Time Spent Teaching Reading	-.00	.009
Ability Grouping	-.00	.009
Freq. of Reading Projects	.01	.010
Adjusted R^2	.740	
$^{+}p < .10$; $*p < .05$; $**p < .01$; $***p < .001$	n = 7,910	

Appendix F: Table F.1 Model 5: Fifth-grade Reading Achievement- Estimated Relationship between SDQ- Reading Subscale and Fifth-grade Reading Achievement, Controlling for Prior Achievement and background Characteristics- SES Interaction

	Early Childhood Longitudinal Study-Kindergarten (ECLS-K)	
Variable	*Beta*	SE
Third-grade Motivation	.012^{+}	.008
Third-grade Achievement	.84***	.007
SES	.09***	.011
Age	-.02*	.008
Race (White = omitted)		
1. Black	-.12**	.036
2. Hispanic	.01	.023
3. Other	.02	.041
Gender = Girl (Boy =omitted)	-.00	.009
SES # Third-grade Motivation	-.00	.005
Adjusted R^2	.745	
$^{+}p < .10$; $*p < .05$; $**p < .01$; $***p < .001$	n = 9,267	

Appendix F: Table F.2 Model 5: Fifth-grade Reading Achievement- Estimated Relationship between SDQ- Reading Subscale and Fifth-grade Reading Achievement, Controlling for Prior Achievement and background Characteristics- Race/ethnicity Interaction

	Early Childhood Longitudinal Study-Kindergarten (ECLS-K)	
Variable	*Beta*	SE
Third-grade Motivation	.015^{+}	.006
Third-grade Achievement	.84***	.007
SES	.09***	.011
Age	-.02*	.008
Race (White = omitted)		
1. Black	-.11**	.040
2. Hispanic	.01	.023
3. Other	-02	.040
Gender = Girl (Boy =omitted)	-.00	.009
Black # Third-grade Reading Motivation	-.02	.035
Hispanic # Third-grade Reading Motivation	.01	.021
Other # Third-grade Reading Motivation	-.03	.022
Adjusted R^2	.745	
$^{+}p < .10$; $*p < .05$; $**p < .01$; $***p < .001$	n = 9,267	

Appendix F: Table F.3 Model 5: Fifth-grade Reading Achievement- Estimated Relationship between SDQ- Reading Subscale and Fifth-grade Reading Achievement, Controlling for Prior Achievement and background Characteristics- Gender Interaction

	Early Childhood Longitudinal Study-Kindergarten (ECLS-K)	
Variable	*Beta*	SE
Third-grade Motivation	.019	.018
Third-grade Achievement	.84***	.007
SES	.09***	.011
Age	-.02*	.008
Race (White = omitted)		
1. Black	-.12**	.039
2. Hispanic	.01	.023
3. Other	.02	.039
Gender = Girl (Boy =omitted)	-.00	.021
Gender # Third-grade Motivation	-.02	.024
Adjusted R^2	.745	
$^{+}p < .10$; $*p < .05$; $**p < .01$; ***p < .001	n = 9,267	

Appendix G. Table G.1 List of Literacy Experts Consulted

Assistant Professor of Policy and Methods at North Carolina State University
Assistant Research Professor at University of Pennsylvania
Associate Professor of Literacy at University of Delaware
Director of Academic Design for American Reading Company with six years of coaching experience and six years of teaching experience in Philadelphia Public Schools
Executive Coach for American Reading Company with 10 years of teaching experience in Camden Public Schools;
Professor of Education Policy at University of Pennsylvania
Professor of Educational Psychology at Purdue University
Professor of Literacy at University of Michigan
Research Specialist at Consortium for Policy Research in Education
Senior Researcher at Consortium for Policy Research in Education
Vice President of Professional Development at American Reading Company with 14 years of education experience in Baltimore Public Schools

Note: All are white, all but three are female.

Appendix H: Table H.1 Final Scale Items

Reading Motivation Dimensions
Enjoyment
Do you like to read? (MRS- Enjoyment)
Do you like it when someone reads to you? (MRS- Enjoyment)
Do you like to look at books by yourself? (MRS- Enjoyment)
Do you like to go to your classroom reading area? **(New)**
Is reading time in school boring? (MRS-Enjoyment)
Do you like it when the teacher reads stories? (MRS- Enjoyment)
Would you like it if someone gave you a book? (MRP- Value, MMRP- Value)
Can you learn new things from books? (MRS- Value)
Can you use books to find answers to questions ?(MRS-Value)
Perceived Competence
Can you read as many words as other kids in your class? (ERMAS)
When the teacher reads books, can you answer questions about the stories? (ERMAS)
Can you help other kids with reading? **(New)**
When your teacher reads stories, can you retell the stories? **(New)**
Is reading by yourself hard? (MRS- Perceived Competence, MRQ-Efficacy, ERMAS, RSCS-Competence; MMRP-Self-Concept)
Are you a good reader? (MRS- Perceived Competence, ABLE- Belief)
Social Motivation
Is there someone you like to read books with? (MRQ-Social)
Do you like to read books with your teacher? **(New)**
Do you like to talk to people about books you read? (MRQ-Social)

Note: source in parenthesis

Appendix I: Table I.1 Administered KRMS Scale

Directions: Ask students the following questions. Tell them there are no right or wrong answers.
If a student answers NO, there are no follow-up questions (except Question 23). If s/he answers YES, ask the follow-up questions (A LOT or A LITTLE, etc.). **Circle** each student's response as the student answers the question.

After the administration is completed, identify the item score that corresponds with each of the student's answers. Write in the item score for each question. If there is no response, enter 0.

☐ Check here if Instrument could not be administered because student does not speak English

☐ Check here if instrument could not be administered because child could not focus/other behavioral issues

1. Do you like to read? NO (1) | YES → A LITTLE (2) or A LOT? (3)
2. Do you like it when someone reads to you? NO (1) | YES → A LITTLE (2) or A LOT? (3)
3. Can you learn new things from books? NO (1) | YES → SOMETIMES (2) or ALWAYS (3)
4. Do you like to look at books by yourself? NO (1) | YES → A LITTLE (2) or A LOT? (3)
5. Does your classroom have a place for reading? NO (1) | YES (3) → 5a. Do you like to go there? NO (1) | YES → A LITTLE (2) or A LOT? (3)
6. Do you like stinky cheese? NO (1) | YES → A LITTLE (2) or A LOT? (3)

7. Would you like it if someone gave you a book?	
NO (1)	YES → A LITTLE (2) or A LOT? (3)
8. Do you like to read books with your teacher?	
NO (1)	YES → A LITTLE (2) or A LOT? (3)
9. Can you find books in your classroom that you want to read? **(may need to repeat)**	
NO (1)	YES → A FEW (2) or LOTS? (3)
10. Is reading by yourself hard? **(reverse scoring)**	
NO (3)	YES → Is it A LITTLE hard (2) or A LOT? (1)
11. Do you like to talk to people about books you read? **(may need to repeat)**	
NO (1)	YES → A LITTLE (2) or A LOT? (3)
12. Is reading time in school boring? **(reverse scoring)**	
NO (3)	YES → SOMETIMES (2) or ALWAYS (1)
13. Can you read as many words as other kids in your class? **(may need to repeat)**	
NO (1)	YES → SOMETIMES (2) or ALWAYS (3)
14. Is there someone you like to read books with? **(do not give examples)**	
NO (1)	YES (3) → Who?  14a. Do you like to read books with **[insert child's response]**? A LITTLE (2) or A LOT? (3)

15. Are there books in your classroom that you can read all by yourself?

NO (1)	YES → A FEW (2) or LOTS? (3)

16. Are you a good reader?

NO (1)	YES → SOMETIMES (2) or ALWAYS (3)

17. Can you use books to find answers to questions?

NO (1)	YES → SOMETIMES (2) or ALWAYS (3)

18. Do you have a pet dinosaur?

NO (1)	YES (3)

19. Can you help other kids with reading?

NO (1)	YES → A LITTLE (2) or A LOT? (3)

20. Does your teacher read stories to the class?

NO (1)	YES (3)

20a. Do you like it when your teacher reads stories?

NO (1)	YES → A LITTLE (2) or A LOT? (3)

20b. Can you answer questions about the stories your teacher reads?

NO (1)	YES → SOMETIMES (2) or ALWAYS? (3)

20c. Can you retell stories?

NO (1)	YES → SOMETIMES (2) or ALWAYS? (3)

21. Does your teacher give you time to read by yourself?

NO (1)

YES (3)

21a. Do you get to pick the books?

NO (1)

YES → SOMETIMES (2) or ALWAYS? (3)

22. Are there books in your home?

NO (1)

YES → A FEW (2) or LOTS? (3)

22a. Do you like the books in your home?

NO (1)

YES → A LITTLE (2) or A LOT? (3)

22b. Are there books in your home that you can read by yourself?

NO (1)

YES → A FEW (2) or LOTS? (3)

23. In the books you read (PAUSE), are there boys and girls that look like you?

NO (1)

YES (3)

23a. What do they look like? Can you describe them? (write verbatim)

_____

_____

_____

23b. What do they look like? Can you describe them? (write verbatim)

_____

_____

_____

23c. Would you like to read books with boys and girls that look like you?

NO (1)

YES → A LITTLE (2) or A LOT? (3)

23d. Are books with boys and girls that look like you your favorite books

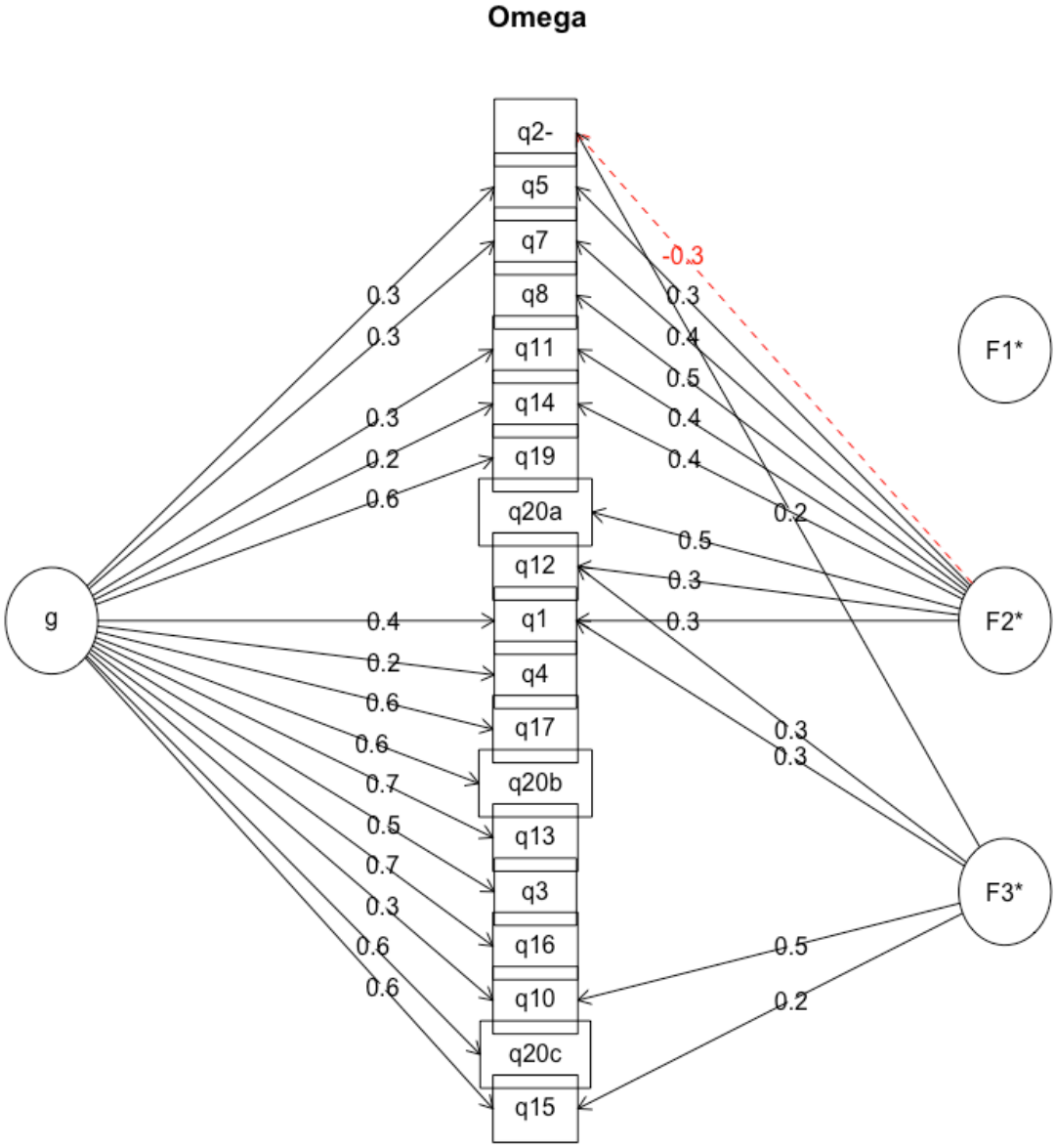
NO (1) YES (3)

24. Tell me what you like to read about? (Probe: What is your favorite book?)

_____

_____

Appendix J: Table J.1 KRMS Omega Analysis Using Three Factors



n = 878

Source: Unpublished data from the IES Zoology One efficacy evaluation (Institute of Education Sciences, n.d.)

BIBLIOGRAPHY

Afflerbach, P., & Cho, B. Y. (2011). The classroom assessment of reading. *Handbook of reading research*, 4, 487-518.

Ary, D., Jacobs, L. C., Irvine, C. K. S., & Walker, D. (2013). *Introduction to research in education*. Cengage Learning.

Allen, M. J., & Yen, W. M. (2001). Introduction to measurement theory. Willow Grove, IL: Waveland Press.

Allison, P. D. (2003). Missing data techniques for structural equation modeling. *Journal of abnormal psychology*, *112*(4), 545.

Allison, P. D. (1999). *Multiple regression: A primer (undergraduate research methods and statistics in the social sciences)*. Newbury Park, CA: Pine Forge Press.

Almlund, M., Duckworth, A. L., Heckman, J. J., & Kautz, T. D. (2011). Personality psychology and economics (No. w16822). National Bureau of Economic Research.

Alvermann, D., & Earle, J. (2003). Comprehension instruction. *Rethinking reading comprehension*, 12-30.

American Educational Research Association, American Psychological Association, National Council on Measurement in Education, Joint Committee on Standards for Educational, & Psychological Testing (US). (2014). *Standards for educational and psychological testing*. American Educational Research Association.

American Reading Company (n.d). *Research labs*. Retrived on 2-6-18 at https://www.americanreading.com/products/content-studies/research-labs/

Applegate, A. J., & Applegate, M. D. (2010). A study of thoughtful literacy and the motivation to read. *The Reading Teacher,* 64(4), 226-234.

Atkins-Burnett, S., Rowan, B., & Correnti, R. (2001). *The use of group versus individual settings for assessing student achievement in kindergarten and first grade.* Consortium for Policy Research in Education, Study of Instructional Improvement, Research Note S-1. Ann Arbor: University of Michigan.

Baker, L., Dreher, M. J., & Guthrie, J. T. (Eds.). (2000). *Engaging young readers: Promoting achievement and motivation*. Pine Grove, PA: Guilford Press.

Baker, L. & Scher, D. (2002). Beginning readers' motivation for reading in relation to parental belies and home reading experiences. *Reading Psychology*, 23, 239-269.

Baker, L., Scher, D., & Mackler, K. (1997). Home and family influences on motivations for reading. *Educational psychologist*, 32(2), 69-82.

Baker, L., & Wigfield, A. (1999). Dimensions of children's motivation for reading and their relations to reading activity and reading achievement. *Reading Research Quarterly*, 34(4), 452-477.

Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological review*, 84(2), 191.

Bandura, A. (1994). Self-efficacy. Hoboken, NJ: John Wiley & Sons, Inc.

Barry, A. L. (2013). Reading preferences and perceptions of urban eighth graders. *Reading Horizons (Online)*, *52*(4), 353.

Bates, C. C., D'Agostino, J. V., Gambrell, L., & Xu, M. (2016). Reading Recovery: Exploring the effects on first-graders' reading motivation and achievement. *Journal of Education for Students Placed at Risk (JESPAR)*,*21*(1), 47-59.

Blake, A. (March, 2017). *Republics' views of black intelligence, work ethnic lag behind Democrats at a record clip.* The Washington Post.

Bowdon, J. (2015). The common core's first casualty: Playful learning. Phi Delta Kappan, 96(8), 33-37.

Bracken, S. S., & Fischel, J. E. (2008). Family reading behavior and early literacy skills in preschool children from low-income backgrounds. *Early Education and Development*, *19*(1), 45-67.

Bradley, R. H., & Corwyn, R. F. (2002). Socioeconomic status and child development. *Annual review of psychology*, *53*(1), 371-399.

Bronfenbrenner, U. (1979). The ecology of human development: Experiments by nature and design. *American Psychologist*, *32*, 513-531.

Bus, A. G., Van Ijzendoorn, M. H., & Pellegrini, A. D. (1995). Joint book reading makes for success in learning to read: A meta-analysis on intergenerational transmission of literacy. *Review of educational research*,*65*(1), 1-21.

Bussey, K., & Bandura, A. (1999). Social cognitive theory of gender development and differentiation. *Psychological review*, *106*(4), 676.

Campaign for Grade-level Reading, The (n.d.) Retrieved from http://gradelevelreading.net/about-us/campaign-overview.

Cartwright, K. B., Marshall, T. R., & Wray, E. (2016). A longitudinal study of the role of reading motivation in primary students' reading comprehension: Implications for a less simple view of reading. *Reading Psychology*, *37*(1), 55-91.

Cantrell, S. C., Almasi, J. F., Rintamaa, M., & Carter, J. C. (2016). Supplemental reading strategy instruction for adolescents: A randomized trial and follow-up study. *The Journal of Educational Research*, *109*(1), 7-26.

Cazden, C. B. (2005). The value of conversations for language development and reading comprehension. *Literacy, Teaching and Learning*, *9*(1/2), 1.

Chapman, J. W., & Tunmer, W. E. (1995). Development of young children's reading self-concepts: An examination of emerging subcomponents and their relationship with reading achievement. *Journal of Educational Psychology*,*87*(1), 154.

Chow, G. C. (1960). Tests of equality between sets of coefficients in two linear regressions. *Econometrica. **28** (3): 591–605.* *JSTOR 1910133. doi:10.2307/1910133.*

Churchill Jr, G. A. (1979). A paradigm for developing better measures of marketing constructs. *Journal of marketing research*, 64-73.

Coddington, C. S., & Guthrie, J. T. (2009). Teacher and student perceptions of boys' and girls' reading motivation. *Reading Psychology*, *30*(3), 225-249.

Conradi, K., Jang, B. G., & McKenna, M. C. (2014). Motivation terminology in reading research: A conceptual review. Educational Psychology Review,26(1), 127-164.

Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical assessment, research & evaluation*, *10*(7), 1-9.

Cox, K.E., & Guthrie, J.T. (2001). Motivational and cogni- tive contributions to students' amount of reading. Contemporary Educational Psychology, 26(1), 116–131. doi:10.1006/ ceps.1999.1044.

Cunha, F., & Heckman, J. J. (2008). Formulating, identifying and estimating the technology of cognitive and noncognitive skill formation. *Journal of human resources*, *43*(4), 738-782.

Cunha, F., Heckman, J. J., & Schennach, S. M. (2010). Estimating the technology of cognitive and noncognitive skill formation. *Econometrica*, *78*(3), 883-931.

Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of research in personality*, 19(2), 109-134.

Deckner, D. F., Adamson, L. B., & Bakeman, R. (2006). Child and maternal contributions to shared reading: Effects on language and literacy development. *Journal of Applied Developmental Psychology*, *27*(1), 31-41.

Dee, T. & West, M. (2008). The Non-Cognitive Returns to Class Size. NBER Working Paper 13994.

Dexter, C. A., & Stacks, A. M. (2014). A preliminary investigation of the relationship between parenting, parent-child shared reading practices, and child development in low-income families. *Journal of Research in Childhood Education*, *28*(3), 394-410.

Drost, E. A. (2011). Validity and reliability in social science research. *Education Research and perspectives*, *38*(1), 105.

Dunn, O. J. (1961). Multiple comparisons among means. *Journal of the American Statistical Association*, *56*(293), 52-64.

Dunning, D., Heath, C., & Suls, J. M. (2004). Flawed self-assessment: Implications for health, education, and the workplace. *Psychological science in the public interest*, *5*(3), 69-106.

Durik, A.M., Vida, M., & Eccles, J.S. (2006). Task values and ability beliefs as predictors of high school literacy choices: A developmental analysis. *Journal of Educational Psychology*, 98(2), 382–393. doi:10.1037/0022-0663.98.2.382

Eccles, J. S. (2005). Subjective task value and the Eccles et al. model of achievement-related choices. *Handbook of competence and motivation*, 105-121.

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual review of psychology*, 53(1), 109-132.

Eccles, J., Wigfield, A., Harold, R. D., & Blumenfeld, P. (1993). Age and gender differences in children's self-and task perceptions during elementary school. *Child development*, 64(3), 830-847.

Elder Jr, G. H., Caspi, A., & Van Nguyen, T. (1986). Resourceful and vulnerable children: Family influence in hard times. In *Development as action in context* (pp. 167-186). Springer Berlin Heidelberg.

Ertem, I. S. (2013). The influence of personalization of online texts on elementary school students' reading comprehension and attitudes toward reading. *International Journal of Progressive Education*, *9*(3), 218-228.

Evans, G. W., & Rosenbaum, J. (2008). Self-regulation and the income-achievement gap. *Early Childhood Research Quarterly,* 23(4), 504-514.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological methods*, *4*(3), 272.

Fives, A. (2016) Modeling the interaction of Academic self-beleifs, frequency of reading at home, eomtional support, and reading achievemnent: an RCT study of at-risk early readers in first grade and second grade. *Reading Psychology,* 37 (3), 339-370.

Frijters, J. C., Barron, R. W., & Brunello, M. (2000). Direct and mediated influences of home literacy and literacy interest on prereaders' oral vocabulary and early written language skill. *Journal of educational psychology*, *92*(3), 466.

Froot, K.A. (1989). Consistent covariance matrix estimation with cross-setional dependence and heteroskedasticity in financial data. *Journal of Financial and Quantitative Analysis* 24: 333-355.

Fulmer, S. M., & Frijters, J. C. (2009). A review of self-report and alternative approaches in the measurement of student motivation. *Educational Psychology Review*, 21(3), 219-246.

Gambrell, L. B. (1996). Creating classroom cultures that foster reading motivation. *The reading teacher*, *50*(1), 14.

George, D., & Mallery, P. (2003). SPSS for Windows step by step: A simple guide and reference. 11.0 update (4th ed.). Boston: Allyn & Bacon.

Gottfried, A. E. (1985). Academic intrinsic motivation in elementary and junior high school students. *Journal of educational psychology*, *77*(6), 631.

Graham, S. (1994). Motivation in african americans. Review of educational research, 64(1), 55-117.

Gray, A. (2018, March). Personal commination.

Gray-little, B., & Hafdahl, A. R. (2000). Factors Influencing Racial Comparisons of Self-esteem. *Psychological Bulletin*, *126*(1), 26-54.

Guay, F., Chanal, J., Ratelle, C. F., Marsh, H. W., Larose, S., & Boivin, M. (2010). Intrinsic, identified, and controlled types of motivation for school subjects in young elementary school children. *British Journal of Educational Psychology,* 80(4), 711-735.

Guthrie, J. T., Coddington, C. S., & Wigfield, A. (2009). Profiles of reading motivation among African American and Caucasian students. *Journal of Literacy Research*, 41(3), 317-353.

Guthrie, J. T., McRae, A., & Klauda, S. L. (2007). Contributions of concept-oriented reading instruction to knowledge about interventions for motivations in reading. *Educational Psychologist,* 42(4), 237-250.

Guthrie, J.T., Van Meter, P., McCann, A.D., & Wigfield, A. (1996). Growth of literacy engagement: Changes in motivations and strategies during concept-oriented reading instruction. *Reading Research Quarterly*, 31(3), 306–332. doi:10.1598/RRQ.31.3.5.

Guthrie, J. T., Wigfield, A., Barbosa, P., Perencevich, K. C., Taboada, A., Davis, M. H., ... & Tonks, S. (2004). Increasing reading comprehension and engagement through concept-oriented reading instruction. *Journal of Educational Psychology*, 96(3), 403.

Guthrie, J.T., Wigfield, A., Metsala, J.L., & Cox, K.E. (1999). Motivational and cognitive predictors of text comprehension and reading amount. *Scientific Studies of Reading*, 3(3), 231–256. doi:10.1207/s1532799xssr0303_3.

Gutman, L. M., & Schoon, I. (2013). The impact of non-cognitive skills on outcomes for young people. *Education Empowerment Foundations*, London.

Halle, T. G., Kurtz-Costes, B., & Mahoney, J. L. (1997). Family influences on school achievement in low-income, African American children. *Journal of Educational Psychology*,*89*(3), 527.

Harter, S., & Pike, R. (1984). The pictorial scale of perceived competence and social acceptance for young children. *Child development*, 1969-1982.

Heath, S. B. (1983). *Ways with words: Language, life and work in communities and classrooms*. cambridge university Press.

Heitin, L. (January, 2016). *ESSA reins in reshapes federal role.* Education Week Retrieved from http://www.edweek.org/ew/articles/2016/01/06/essa-reins-in-reshapes-federal-role-in.html.

Hemmings, B., Grootenboer, P., & Kay, R. (2011). Predicting mathematics achievement: The influence of prior achievement and attitudes. *International Journal of Science and Mathematics Education,* 9(3), 691-705.

Hernandez, D. J. (2011). Double Jeopardy: How Third-grade Reading Skills and Poverty Influence High School Graduation. *Annie E. Casey Foundation*.

Hickey, D. T. (2003). Engaged participation versus marginal nonparticipation: A stridently sociocultural approach to achievement motivation. *Elementary School Journal,* 103(4), 401-29.

Higgins, E., Fitzgerald, J., & Howard, S. (2015). "Literacy Lift-Off": an experimental evaluation of a reading recovery programme on literacy skills and reading self-concept. *Educational Psychology in Practice*, *31*(3), 247-264.

Hoxby, C. M. (2000). The effects of class size on student achievement: New evidence from population variation. The Quarterly Journal of Economics, 115(4), 1239-1285.

Hu Dehart E. & Garcia Coll D. (2010). *The immigrant paradox in children's education and behavior: Evidence from new research.* Providence, RI: Brown University.

Jacobs, J. E., Lanza, S., Osgood, D. W., Eccles, J. S., & Wigfield, A. (2002). Changes in children's self-competence and values: Gender and domain differences across grades one through twelve. *Child development*, *73*(2), 509-527.

Jackson, Y. (Ed.). (2006). Encyclopedia of multicultural psychology Thousand Oaks, CA: Sage Publications, Inc.

Johanson, G. A., & Brooks, G. P. (2010). Initial scale development: sample size for pilot studies. *Educational and Psychological Measurement*, *70*(3), 394-400.

Kamil, M., Pearson, P. D., Afflerbach, P., & Moje, E. B. (Eds.). (2011). *Handbook of reading research (*Vol. 4). Mahwah, NJ: Erlbaum/Taylor & Francis.

Katranci, M. (2015). Book reading motivation scale: Reliability and validity study. *Educational Research and Reviews*, *10*(3), 300.

Kautz, T., Heckman, J. J., Diris, R., Ter Weel, B., & Borghans, L. (2014). *Fostering and measuring skills: Improving cognitive and non-cognitive skills to promote lifetime success* (No. w20749). National Bureau of Economic Research.

Kena, G., Hussar, W., McFarland, J., de Brey, C., Musu-Gillette, L., Wang, X., ... & Barmer, A. (2016). The Condition of Education 2016. NCES 2016-144. National Center for Education Statistics.

Knapp, T. R. (1991). Focus on psychometrics. Coefficient alpha: conceptualizations and anomalies. *Research in nursing & health*,*14*(6), 457-460.

Lau, K. (2009). Reading motivation, perceptions of reading instruction and reading amount: A comparison of junior and senior secondary school students in Hong

Kong. *Journal of Research in Reading*, 32(4), 366–382. doi:10.1111/j.1467-9817.2009.01400.x.

Lepper, M. R., Corpus, J. H., & Iyengar, S. S. (2005). Intrinsic and extrinsic motivational orientations in the classroom: age differences and academic correlates. *Journal of educational psychology*, 97(2), 184.

Leslie, L., & Allen, L. (1999). Factors that predict success in an early literacy intervention project. *Reading Research Quarterly*, *34*(4), 404-424.

Lesnick, J., Goerge, R., & Smithgall, C. (2010). Reading on Grade Level in Third Grade: How Is It Related to High School Performance and College Enrollment?. Annie E. Casey Foundation. Retrieved from http://www.aecf.org/m/resourcedoc/aecfReadingonGradeLevelLongAnal-2010.PDF.

Malloy, J. A., Marinak, B. A., Gambrell, L. B., & Mazzoni, S. A. (2013). Assessing motivation to read. *The Reading Teacher*,*67*(4), 273-282.

Marinak, B. A. (2013). Courageous reading instruction: The effects of an elementary motivation intervention. *The Journal of Educational Research*,*106*(1), 39-48.

Marinak, B. A., & Gambrell, L. B. (2010). Reading motivation: Exploring the elementary gender gap. *Literacy Research and Instruction*, 49(2), 129-141.

Marinak, B. A., Malloy, J. B., Gambrell, L. B., & Mazzoni, S. A. (2015). Me and my reading profile. *The Reading Teacher*, *69*(1), 51-62.

Marsh, H. W., & Ayotte, V. (2003). Do Multiple Dimensions of Self-Concept Become More Differentiated With Age? The Differential Distinctiveness Hypothesis. *Journal of Educational Psychology*, *95*(4), 687.

Marsh, H. W., Barnes, J., Cairns, L., & Tidman, M. (1984). Self-Description Questionnaire: Age and sex effects in the structure and level of self-concept for preadolescent children. Journal of Educational psychology, 76(5), 940.

Martini, F., & Sénéchal, M. (2012). Learning literacy skills at home: Parent teaching, expectations, and child interest. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement*, *44*(3), 210.

Mata, L. (2011). Motivation for reading and writing in kindergarten children.*Reading Psychology*, 32(3), 272-299.

Mazzoni, S. A., Gambrell, L. B., & Korkeamaki, R. L. (1999). A cross-cultural perspective of early literacy motivation. *Reading Psychology*, 20(3), 237-253.

McDonald, R. P. (1999). Test theory: A unified treatment. L. Erlbaum Associates, Mahwah, N.J.

McGeown, S. P., Osborne, C., Warhurst, A., Norgate, R., & Duncan, L. G. (2016). Understanding children's reading activities: Reading motivation, skill and child characteristics as predictors. *Journal of research in reading*, *39*(1), 109-125.

McGraw-Hill, C. T. B. (1997). Teacher's guide to the Terra Nova.

McKenna, M. C., & Kear, D. J. (1990). Measuring attitude toward reading: A new tool for teachers. *The Reading Teacher*, 43(9), 626-639.

McKenna, M. C., Kear, D. J., & Ellsworth, R. A. (1995). Children's attitudes toward reading: A national survey. *Reading Research Quarterly*, 934-956.

McLoyd, V. C. (1998). Socioeconomic disadvantage and child development. *American psychologist*, *53*(2), 185.

Mizuno, K., Tanaka, M., Ishii, A., Tanabe, H. C., Onoe, H., Sadato, N., & Watanabe, Y. (2008). The neural basis of academic achievement motivation. *NeuroImage*, 42, 369-378.

Molfese, V. J., Modglin, A., & Molfese, D. L. (2003). The role of environment in the development of reading skills: A longitudinal study of preschool and school-age measures. *Journal of learning disabilities*, *36*(1), 59-67.

Möller, J., & Bonerad, E. (2007). Fragebogen zur habituellen Lesemotivation [Habitual Reading Motivation Questionnaire]. *Psychologie in Erziehung und Unterricht*, 54(4), 259–267.

Monteiro, V. (2013). Promoting reading motivation by reading together. *Reading Psychology*, *34*(4), 301-335.

Morgan, P. L., & Fuchs, D. (2007). Is there a bidirectional relationship between children's reading skills and reading motivation?. *Exceptional children*, *73*(2), 165-183.

Mullis, I. V., Martin, M. O., Foy, P., & Drucker, K. T. (2012). PIRLS 2011 International Results in Reading. International Association for the Evaluation of Educational Achievement. Herengracht 487, Amsterdam, 1017 BT, The Netherlands.

National Center on Education Statistics (2012a). Trends in academic progress, the nations report card. Retrieved from https://nces.ed.gov/nationsreportcard/subject/publications/main2012/pdf/2013456.pdf.

National Center on Education Statistics (2016). The condition of education, chapter three. Retrireved from https://nces.ed.gov/programs/coe/pdf/coe_cnb.pdf.

Nering, M. L., & Ostini, R. (Eds.). (2011). *Handbook of polytomous item response theory models.* Taylor & Francis.

Nolen, S. B. (2007). Young children's motivation to read and write: Development in social contexts. *Cognition and instruction*, 25(2-3), 219-270.

Onatsu-Arvilommi, T., Nurmi, J.-E., & Aunola, K. (2002). The development of achievement strategies and academic skills during the first year of primary school. Learning and Instruction, 12, 509 –527.

Ozturk, G., Hill, S., Yates, G. (2016) Family context and five-year-old children's attitudes towards literacy when they are learning to read. *Reading Psychology*, 37(3), 487-509.

Padilla, Cabrera, & West (2017). *The development and home environmennts of hispanic children: kindergarten to thrid grade.* National Research Center on Hispanic Children & Families. Retrived from http://www.hispanicresearchcenter.org/wp-content/uploads/2017/09/Developmental-Profiles.pdf.

Pagan, S., & Sénéchal, M. (2009, June). *Reading for pleasure and literacy performance in elementary school: The role of motivation.* Poster presented at the 17th annual meeting of the Society for the Scientific Study of Reading, Boston, MA.

Pajares, F. (1997). Current directions in self-efficacy research. Advances in motivation and achievement, 10(149), 1-49.

Palacios, N., Guttmannova, K., & Chase-Lansdale, P. L. (2008). Early reading achievement of children in immigrant families: Is there an immigrant paradox?. *Developmental psychology*, *44*(5), 1381.

Park, Y. (2011). How motivational constructs interact to predict elementary students' reading performance: Examples from attitudes and self-concept in reading. *Learning and Individual Differences*, *21*(4), 347-358.

Paulhus, D. L. (2002). Socially desirable responding: The evolution of a construct. *The role of constructs in psychological and educational measurement*, *4969*.

Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology*, 95, 667-686.

Philadelphia Public Schools (2016, August). *The comprehensive literacy framework of pre-k to grade 5*. Retrieved on 2-6-18 at https://www.philasd.org/earlychildhood/wp-content/uploads/sites/835/2017/11/Edited-CLF-8-25-16.Final_.pdf.

Read by 4th (n.d). Retrieved from http://readby4th.org/.

Reardon, S. F., Valentino, R. A., Kalogrides, D., Shores, K. A., & Greenberg, E. H. (2013). Patterns and trends in racial academic achievement gaps among states, 1999-2011. *Unpublished Working Paper. Center for Education Policy Analysis, Stanford* University.

Revelle, W. (November, 2017). *An introduction to the psych package: Pare II scale construction and psychometrics.* Personality Project.

Revelle, W. and Rocklin, T. (1979). Very Simple Structure - alternative procedure for estimating the optimal number of interpretable factors. Multivariate Behavioral Research, 14(4):403–414.

Rogers, W.H. (1993). Regression standard errors in clustered samples. *Stata Technical Bulletin* 13: 19-23

Rothstein, J. M. (2004). College performance predictions and the SAT. Journal of Econometrics, 121(1), 297-317.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being.*American psychologist*, *55*(1), 68.

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

Samuelsson, S., & Lundberg, I. (2003). The impact of environmental factors on components of reading and dyslexia. *Annals of dyslexia*, *53*(1), 201-217.

Saracho, O. N. (1988). A study of the roles of early childhood teachers. *Early Child Development and Care*, 38(1), 43-56.

Schaffner, E., Philipp, M., & Schiefele, U. (2016). Reciprocal effects between intrinsic reading motivation and reading competence? A cross-lagged panel model for academic track and nonacademic track students. *Journal of Research in Reading*, *39*(1), 19-36.

Schiefele, U., & Schaffner, E. (2016). Factorial and construct validity of a new instrument for the assessment of reading motivation. *Reading Research Quarterly*.

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

Saracho, O. N., & Dayton, C. M. (1989). A factor analytic study of reading attitudes in young children. *Contemporary educational psychology*, 14(1), 12-21.

Sénéchal, M., & LeFevre, J. A. (2002). Parental involvement in the development of children's reading skill: A five-year longitudinal study. *Child development*, *73*(2), 445-460.

Shaw, E. J., Kobrin, J. L., Patterson, B. F., & Mattern, K. D. (2012). The Validity of the SAT® for Predicting Cumulative Grade Point Average by College Major. Research Report 2012-6. *College Board.*

Singer, Vivian, and Kathernie Strasser. "The association between arithmetic and reading performance in school: A meta-analytic study." *School Psychology Quarterly* 32, no. 4 (2017): 435.

Sirin, S. R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of educational research*, 75(3), 417-453.

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

Smetana, J. G., Crean, H. F., & Daddis, C. (2002). Family processes and problem behaviors in middle-class African American adolescents. *Journal of Research on Adolescence*, *12*(2), 275-304.

Snow, C. E., Burns, M. S., & Griffin, P. (1998). Preventing reading failure in young children. *Preventing reading failure in young children*.

Spear-Swerling, L., & Sternberg, R. J. (1994). The road not taken: An integrative theoretical model of reading disability. *Journal of learning disabilities*, *27*(2), 91-103.

Sperling, R. A., & Head, D. M. (2002). Reading attitudes and literacy skills in prekindergarten and kindergarten children. *Early Childhood Education Journal*, 29(4), 233-236.

Sperling, R. A., Sherwood, T. P., & Hood, A. M. (2013). Relating motivation to read and emergent reading skills: a measurement validation study.*Reading Psychology*, 34(5), 461-485.

Stack, M. H., Moorefield-Lang, H., & Barksdale, M. A. (2015). Able: An instrument for assessing elementary students' perceptions of access to books, beliefs, and literacy environment.*Reading Psychology*, *36*(6), 499-518.

Stainthorp, R., & Hughes, D. (2004). What happens to precocious readers' performance by the age of eleven?. *Journal of Research in Reading*, *27*(4), 357-372.

Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading research quarterly*, 360-407.

StataCorp LP. 2013. Stata Survey Data Reference Manual, Release 13, College Station Texas: Stata Press Publication.

Sternberg, R. J., Grigorenko, E., & Bundy, D. A. (2001). The predictive value of IQ. Merrill-Palmer Quarterly, 47(1), 1-41.

Stipek, D. J. (1996). Motivation and instruction. *Handbook of educational psychology*, 85-113.

Stipek, D. J., & Ryan, R. H. (1997). Economically disadvantaged preschoolers: ready to learn but further to go. *Developmental psychology*,33(4), 711.

Suizzo, M. A., & Stapleton, L. M. (2007). Home-based parental involvement in young Children's education: Examining the effects of maternal education across US ethnic groups. *Educational Psychology*, *27*(4), 533-556.

Tabachnick, B. G., & Fidell, L. S. (2001). Principal components and factor analysis. *Using multivariate statistics*, *4*, 582-633.

Taboada, A., Tonks, S.M., Wigfield, A., & Guthrie, J.T. (2009). Effects of motivational and cognitive variables on reading com- prehension. *Reading and Writing*, 22(1), 85–106.

Taylor, B. M., Pressley, M., & Pearson, P. D. (2002). *Supported characteristics of teachers and schools that promote reading achievement* (pp. 361-374). Mahwah, NJ: Erlbaum.

Tourangeau, K., Nord, C., Lê, T., Pollack, J. M., & Atkins-Burnett, S. (2006). ECLS-K: Combined user's manual for the ECLS-K fifth-grade data Files and Electronic Codebooks. *National Center for Education Statistics.*

Twenge, J. M., & Crocker, J. (2002). Race and self-esteem: meta-analyses comparing whites, blacks, Hispanics, Asians, and American Indians and comment on Gray-Little and Hafdahl (2000). *Psychological bulletin*, *128*(3), 371.

Urdan, T., & Schoenfelder, E. (2006). Classroom effects on student motivation: Goal structures, social relationships, and competence beliefs.*Journal of school psychology*, 44(5), 331-349.

Unrau, N., & Schlackman, J. (2006). Motivation and its relation- ship with reading achievement in an urban middle school. *The Journal of Educational Research,* 100(2), 81–101.

Velicer, W. (1976). Determining the number of components from the matrix of partial correlations. *Psychometrika,* 41(3):321–327.

Varuzza, M., Sinatra, R., Eschenauer, R., & Blake, B. E. (2014). The relationship between English language arts teachers' use of instructional strategies and young adolescents' reading motivation, engagement, and preference. Journal of Education and Learning, 3(2), 108.

Wang, J.H., & Guthrie, J.T. (2004). Modeling the effects of intrin- sic motivation, extrinsic motivation, amount of reading, and past reading achievement on text comprehension between U.S. and Chinese students. *Reading Research Quarterly*, 39(2), 162–186. doi:10.1598/RRQ.39.2.2.

Wayne, A. J., & Youngs, P. (2003). Teacher characteristics and student achievement gains: A review. *Review of Educational research,* 73(1), 89-122.

Weyer, M. (July, 2017). *Third-grade reading legislation*. National Conference on State Legislatures. Retrieved from http://www.ncsl.org/research/education/third grade-reading-legislation.aspx.

West, M. R., Kraft, M. A., Finn, A. S., Martin, R. E., Duckworth, A. L., Gabrieli, C. F., & Gabrieli, J. D. (2016). Promise and paradox: Measuring students' non-cognitive skills and the impact of schooling. *Educational Evaluation and Policy Analysis*, 38(1), 148-170.

Wigfield, A. (1996). A Questionnaire Measure of Children's Motivations for Reading. Instructional Resource No. 22.

Wigfield, A., & Guthrie, J. T. (2000). Engagement and motivation in reading. *Handbook of reading research*, 3, 403-422.

Wigfield, A., & Eccles, J. S. (1992). The development of achievement task values: A theoretical analysis. *Developmental review*, *12*(3), 265-310.

Wigfield, A., & Eccles, J. S. (2000). Expectancy–value theory of achievement motivation. *Contemporary educational psychology*, 25(1), 68-81.

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

Williams, R.L. (2000). A note on robust variance estimation for cluster-correlated data. *Biometrics* 56: 645-646.

Wilson, K. M., & Trainin, G. (2007). First-grade students' motivation and achievement for reading, writing, and spelling. *Reading Psychology*, *28*(3), 257-282.

Woodcock, R. W. (2011). Woodcock Reading Mastery Test (3rd ed.). San Antonio, TX: Pearson.

Wooldridge, J.M. (2002). *Econometric Analyses of Cross Section and Panel Data.* Cambridge, Mat: MIT Press.

Zheng, G., Schwanenflugel, P. J., & Rogers, S. M. (2016). Emergent Motivation to Read in Prekindergarten Children. *Reading Psychology*, *37*(3), 392-423.