

Article

The Baylor Revision of the Motivation to Read Survey (B-MRS)

Marley W. Watkins and Larry J. Browning
Baylor University

Although reading motivation has been recognized as important by both teachers and researchers, scales to measure reading motivation have not been well validated. The structural validity of one promising measure of reading motivation, the Reading Survey (MRS) portion of the Motivation to Read Profile, was investigated in the current study with initial ($N = 933$), calibration ($N = 545$), and normative ($N = 2,146$) samples. Data from the initial sample revealed the anticipated two factors of reading self-concept and value of reading, but identified three problematic items. Those items were replaced and the resulting Baylor revision of the MRS (B-MRS) was administered to the calibration sample. Exploratory factor analysis of the calibration sample data revealed the anticipated two factors with no problematic items. Confirmatory factor analysis was then applied to B-MRS data from the normative sample. Using multilevel methods because students were nested in classrooms, a two-factor theoretical structure was found to fit within students whereas a one-factor model best fit between classrooms. Girls tended to have more positive reading self-concepts and valued reading at higher levels than boys while both reading self-concept and value of reading scores decreased as grade level increased. Norms were described and use of the B-MRS by practitioners and researchers was encouraged.

Keywords: factor analysis, validity, reading motivation, reading

The importance of reading to individuals and society cannot be overstated. Consequently, there is an obvious need to teach all children to read at proficient levels. Unfortunately, this need is not being effectively met. Data from the National Assessment of Educational Progress (NCES, 2013) indicates that 32% of tested 4th grade students and 22% of tested 8th grade students were Below Basic in reading skills. Below Basic means that these students did not demonstrate even partial mastery of the reading skills needed for proficient work at their grade level (NCES, 2013).

Reading skill and its development has been a major research interest in education and psychology for decades (Adams, 1990). Historically, most research focused on the cognitive aspects of reading such as phonemic awareness, word reading, fluency, vocabulary, and comprehension (Gough & Tunmer, 1986; LaBerge & Samuels, 1974; Perfetti & Stafura, 2014; Rayner, Foorman, Perfetti, Pesetsky, & Seidenberg,

2001; Snow, Burns, & Griffin, 1998). Stanovich (1986) noted that nearly every cognitive task that comprises the act of reading has been investigated, and more recent research has provided considerable guidance for fostering development of skilled readers (Hairrell, Rupley, & Simmons, 2011; Hattie, 2012; Hulme & Snowling, 2011; Marulis & Neuman, 2013; Piasta & Wagner, 2010; Slavin, Lake, Chambers, Cheung, & Davis, 2009; Snowling & Hulme, 2011).

Although important to teachers (O'Flahavan, Gambrell, Guthrie, Stahl, & Alvermann, 1992), aff-

Author's Note: Marley Watkins, Department of Educational Psychology, Baylor University; Larry Browning, Department of Curriculum and Instruction, Baylor University. This study was supported in part by funds from the University Research Committee and the Vice Provost for Research at Baylor University. Correspondence concerning this article should be addressed to Marley Watkins, Department of Educational Psychology, Baylor University, Waco, TX 76798-7301. E-mail: Marley_Watkins@baylor.edu

ective facilities have only recently been recognized as potentially important contributors to reading proficiency (Afflerbach & Cho, 2011; Graham & Weiner, 1996; Hidi & Harackiewicz, 2000). Reading motivation in particular has garnered a substantial amount of attention as it applies to student learning (Graham & Weiner, 2012). For example, an early quantitative synthesis of the research on motivation and achievement found that around 11% of the variance in achievement was accounted for by motivation (Uguroglu & Walberg, 1979). More recently, a meta-analysis of 69 data sets involving more than 125,000 students found that verbal achievement and verbal self-concept were related at $r = .49$ (Möller, Pohlmann, Köller, & Marsh, 2009). These results seem to be consonant with commonsense views: It is intuitively pleasing to assume that students who read well do so partly because they are motivated to read, and those students who do not read well struggle partly because they are not motivated (Stanovich, 1986).

Over time, researchers have examined both affective and cognitive variables and considered the potential for interaction and synergy between cognitive *skill* and motivational *will* (Linnenbrink & Pintrich, 2002; Paris & Oka, 1986). In fact, considerable evidence has accumulated to suggest that affective and cognitive variables are reciprocally related and mutually reinforcing (Chamorro-Premuzic, Harlaar, Greven, & Plomin, 2010; Marsh, Xu, & Martin, 2012; Morgan & Fuchs, 2007; Retelsdorf, Köller, & Möller, 2014). Simultaneously, motivation theories (e.g., expectancy-value theory, self-determination theory, attribution theory, goal theory, etc.) were developed to explain the accumulating empirical findings and guide future research (Graham & Weiner, 2012; Pintrich & Schunk, 2002). These theories posited an array of constructs to explain motivated reading behavior (Anderman, Gray, & Chang, 2013; Guthrie & Coddington, 2009; Murphy & Alexander, 2000; Schiefele, Schaffner, Möller, & Wigfield, 2012), such as intrinsic and extrinsic motivation, perceived autonomy, self-concept, self-efficacy, task mastery goals, performance goals, prosocial goals, compliance goals, value, and autonomous motivation (Conradi, Jang, & McKenna, 2014).

As with all theories, those concerning reading motivation "can be divided into two parts: one that specifies relationships between theoretical constructs

and another that describes relationships between constructs and measures" (Edwards & Bagozzi, 2000, p. 155). Most of the research on reading motivation has dealt with the relationships between theoretical constructs (i.e., reading motivation and reading achievement) and relatively little attention has focused on the relationship between constructs and measures. That is unfortunate because a robust construct-measure relationship allows an unambiguous mapping of theoretical constructs onto empirical measures and is, in effect, an auxiliary theory (Edwards & Bagozzi, 2000). In educational and psychological measurement, the construct-measure relationship is often recognized under the rubric of structural validity. That is, whether the structure of scores generated by a measure reflects the theoretical structure of the construct (Messick, 1995). Strong structural validity evidence facilitates both research and practice (Kane, 2013) and should precede research on the relationships between constructs (Meehl, 1990).

Recognizing a need for valid measures of reading motivation (Schunk, 2000), researchers have developed a number of scales designed to measure reading motivation, but most are distinguished by "poor construction and limited validation" (Fulmer & Frijters, 2009, p. 226). Two scales that have received considerable attention are the Motivations for Reading Questionnaire (MRQ; Wigfield, Guthrie, & McGough, 1996) and the Survey portion of the Motivation to Read Profile (MRS; Gambrell, Palmer, Codling, & Mazzoni, 1996). The MRQ is a 54-item group administered scale with a 4-point response format that purports to measure 11 aspects of reading motivation. Although the MRQ has frequently been applied in reading research (e.g., Kluda & Wigfield, 2012), an extensive analysis of its structural validity concluded that the MRQ should not be used (Watkins & Coffey, 2004, p. 117).

The MRS is a 20-item group administered survey with a 4-point response format that measures two aspects of reading motivation: self-concept as a reader and value of reading. An individually administered interview was also included in the Motivation to Read Profile but will not be considered further because it uses an open-ended question format and was not designed to be scored. Based on expectancy-value theory (Eccles, 1983), the items in the reading self-concept scale were designed to assess students' expectations of success in reading and the items in

the value of reading scale were designed to measure the value students ascribe to reading. In essence, "Can I do it? Do I want it?" (Graham & Weiner, 2012, p. 372).

Structural validity for the MRS was supported by exploratory factor analysis (EFA) using unweighted least squares extraction and varimax rotation on data from 330 third- and fifth-grade students in 27 classrooms in four schools from two school districts in an Eastern state (Gambrell et al., 1996). Subsequently, the MRS has been applied in reading research (Applegate & Applegate, 2011; Gambrell, Hughes, Calvert, Malloy, & Igo, 2011; Marinak, 2013; Marinak & Gambrell, 2008, 2010; Quirk, Schwanenflugel, & Webb, 2009) and has twice been revised for use with adolescents (Kelley & Decker, 2009; Pitcher et al., 2007). Unfortunately, research on the MRS has not attended to its psychometric properties nor its structural validity.

The MRS was recently revised by Malloy, Marinak, Gambrell, and Mazzoni (2013) to modernize and update its content. The revised MRS retained seven of the original items, replaced one item, and modified 12 items. Modifications tended to be minor. For example, "almost never" replaced "not very often" as one response option and "My friends think reading is" replaced the original stem of "My best friends think reading is." The revised MRS was administered to 281 students in three schools in Virginia, South Carolina, and Pennsylvania. Alpha coefficients for the reading self-concept and value of reading scales were .81 and .85, respectively. It is not clear if the structural validity of the revised scale was evaluated because almost no methodological details were provided. For example, Malloy et al. (2013) simply reported that "a nonparametric analysis was used to determine validity using a root mean square error of approximation (RMSEA)...estimate of .089 was revealed" (p. 275). An RMSEA value of .089 would reflect a less-than-adequate overall fit of the model to the data, individual parameter estimates were evidently not reviewed, and there has been no other research on this revision of the MRS.

Critically, the structural validity investigations of the original MRS (Gambrell et al., 1996) and revised MRS (Malloy et al., 2013) were also methodologically flawed. For example, the four-option item responses constitute ordered categories rather than continuous values. In such cases, polychoric correla-

tions should be submitted to factor analysis rather than Pearson product moment correlations (Flora, LaBrish, & Chalmers, 2012). Further, analyzing individual student data for classes of students violates the fundamental assumption of independence with an attendant risk of biased parameter estimates (De Naeghel & Van Keer, 2013; Muthén, 1994). Also, sub-dimensions of reading motivation (i.e., reading self-concept and reading value) are likely to be related to some extent and forcing them to be orthogonal with a varimax rotation as done by Gambrell et al. (1996) may have resulted in a distorted factor solution (Gorsuch, 1997). Finally, no other details of the factor analyses were reported by Gambrell et al. (1996) or Malloy et al. (2013), which does not allow for informed review and replication (Ford, MacCallum, & Tait, 1986).

Given these lacunae, the current study was designed to analyze the structural validity of the original MRS and use that evidence to revise the MRS and collect validity evidence on the new revision. The resulting validity evidence will allow practitioners to better identify, implement, and evaluate interventions to improve reading motivation and achievement (Guthrie, 2011) and will provide researchers with a measure for use in future research.

Original MRS Study

Method

Instrument. The Reading Survey portion of the Motivation to Read Profile is a 20-item (each with four response options) scale for students in grades 2-6. As described by Gambrell et al. (1996), it is a "public-domain instrument" (p. 519) with 10 reading self-concept items "designed to elicit information about students' self-perceived competence in reading and self-perceived performance relative to peers" and 10 value of reading items "designed to elicit information about the value students place on reading tasks and activities" (p. 522).

The first validation study by Gambrell et al. (1996) included 330 third- and fifth-grade students in 27 classrooms in four schools from two school districts in an Eastern state. Gambrell et al. (1996) found that internal consistency reliability was .75 and .82 for the self-concept and value scales, respectively. An alpha coefficient of .89 was subsequently compu-

ted for the total MRS score with a group of 219 students in seven grade 3-5 classrooms (Gambrell et al., 2011).

Participants. A total of 933 students (48.8% male) in grades 1 through 5 (5.5% in first grade with 55% male, 7.5% in second grade with 54% male, 30% in third grade with 48% male, 32% in fourth grade with 45% male, and 25% in fifth grade with 52% male) from Arizona ($n = 340$), Maryland ($n = 333$), and Pennsylvania ($n = 260$) completed all 20 MRS items. No further demographic information was collected on individual students to protect participants' confidentiality.

Procedures. Data were obtained from elementary schools in Arizona ($n = 1$), Maryland ($n = 2$), and Pennsylvania ($n = 1$) secondary to other research projects or local program evaluations (Neuhard, 2004; Runge, 1998; Young, 2000). Students were enrolled in 42 separate classrooms with an average class size of 22.2 students. The Pennsylvania school was located in a rural area, fewer than 1% of its students were minority, and around 35% of its students received free or reduced lunch. The Maryland schools were in suburban areas, around 28% of their students were minority and 43% received free or reduced lunch. The Arizona school was also in a suburban area. Around 25% of its students were minority and around 30% received free or reduced lunch. Directions and test items were read aloud to students by researchers or teachers following the instructions provided by Gambrell et al. (1996). Unit weighted reading self-concept and value of reading scores were computed as per Gambrell et al. (1996).

Analyses. Given the well-developed theoretical expectation of two MRS factors, confirmatory factor analysis (CFA) was implemented with Mplus version 7.2 (Muthén & Muthén, 2014). Based on the ordered categorical data, polychoric correlations and the WLSMV estimator were selected (Lei & Wu, 2012). Overall model fit was evaluated with the comparative fit index (CFI) and the root mean square error of approximation (RMSEA). Criteria for adequate model fit were $CFI \geq .90$ and $RMSEA \leq .08$ whereas good model fit required $CFI \geq 0.95$ and $RMSEA \leq 0.06$ (Hu & Bentler, 1999). Intraclass correlations for items ranged from .03 to .08 with a median of .06, indicating that non-independence of student data should be considered in the analyses (Muthén, 1997).

Results

As suggested by Hox (1995), a baseline model was established by comparing one- and two-factor models without regard for nested data. The two-factor model was clearly superior to the one-factor model (CFI of .95 vs. .83 and RMSEA of .07 vs. .14, respectively) although its overall fit was only adequate. Next, the non-independence of student data was taken into account with the Mplus cluster procedure in a two-factor model, which exhibited good fit to the data (CFI of .96 and RMSEA = .05). Thus, the two-factor structure of the Reading Survey portion of the Motivation to Read Profile was supported. The two factors correlated at .60 and exhibited alpha coefficients of .82 (95% CI [.78, .85]) for the reading self-concept factor and .84 (95% CI [.80, .87]) for the value of reading factor.

Regardless of overall model fit, inspection of the standardized parameter estimates revealed two problems with the two-factor model: one reading self-concept item (#11) and one value of reading item (#18) were weakly related to their respective factors (.12 and .21, respectively) in comparison to the remainder of the items ($Md = .70$). Additionally, several students spontaneously wrote critical comments on protocols about the stem of item 17 (*When I am in a group talking about stories*) indicating that talking about stories in a group was only for primary grade students. Interestingly, the lack of ecological validity of item #17 may have been noticed in prior studies because its stem was revised in both attempts to create an adolescent version of the MRS (i.e., Kelley & Decker, 2009; Pitcher et al., 2007). Altogether, then, three of the 20 items on the Survey portion of the Motivation to Read Profile were problematic and required revision or replacement.

Results for the reading self-concept and value of reading scales across grade level and sex are illustrated in Figure 1. Regression analyses were conducted using clustered robust standard errors within Stata 13 to adjust for non-independence of the data. For reading self-concept, grade was a statistically significant predictor ($t = -2.47$, $df = 4$, $p = .018$, $R^2 = .02$), but neither sex nor the grade by sex interaction were significant predictors ($p > .05$). In contrast, both grade ($t = -4.10$, $df = 4$, $p < .001$, $R^2 = .06$) and sex ($t = 2.61$, $df = 1$, $p = .013$, $R^2 = .02$) were significant

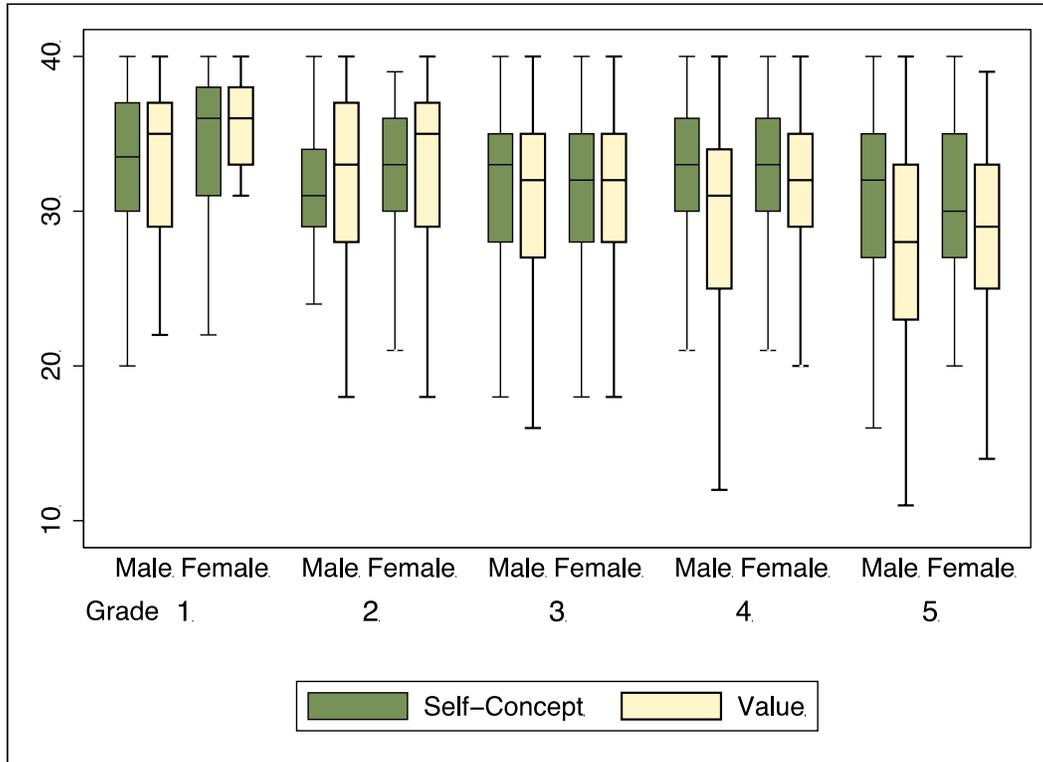


Figure 1. Reading Self-Concept and Value of Reading Scores on the Motivation to Read Survey (MRS) for 933 Male and Female Students in Grades 1 Through 5.

predictors for the value of reading scale, but the grade by sex interaction was not a significant predictor ($p > .05$). The correlation between grade and reading self-concept was -0.10 and between grade and the value of reading was -0.23 indicating that both types of reading motivation declined as grade level increased. The correlation between sex and the value of reading was 0.13 , indicating that girls tended to value reading more than boys.

Calibration Study

Method

Instrument. Seventeen items of the Reading Survey portion of the Motivation to Read Profile were retained. Several alternatives were created for items 11, 17, and 18 and qualitatively reviewed by a reading expert and a psychometrician. Following pilot tests with small samples of volunteer students, new items 11, 17, and 18 were selected based on psychometric performance and incorporated into the Baylor revision of the MRS (B-MRS). The B-MRS

scale as well as standardized administration instructions and score sheets can be freely downloaded from <http://edpsychassociates.com>.

Participants. A total of 545 students (49.5% male) in grades 1 through 8 (10% in first grade with 48% male, 17% in second grade with 48% male, 17% in third grade with 45% male, 15% in fourth grade with 56% male, 15% in fifth grade with 51% male, 3% in sixth grade with 66% male, 18% in seventh grade with 45% male, and 5% in eighth grade with 56% male) served as participants. No further demographic information was collected on individual students to protect participants' confidentiality.

Procedures. Data were obtained from a school in rural Pennsylvania secondary to local program evaluation activities. No further identifying information about students or teachers was made available. However, the school district enrolled around 9% minority students and offered free/reduced lunch to approximately 57% of its students. Directions and test items were read aloud to students by teachers following standardized instructions.

Analyses. Given the scale revision and attendant

uncertainty about its structure, an EFA using polychoric correlations was applied with the *psych* package within the **R** program (R Development Core Team, 2014). Following the best practice EFA guidelines (Ford et al., 1986; Gorsuch, 1997), the number of factors to retain for rotation was determined by parallel analysis and minimal average partials (MAP) criteria, principal axis extraction with oblimin rotation were specified, and pattern coefficients $\geq .32$ were predetermined to be salient.

Results

Both parallel analysis and MAP criteria indicated that two factors should be extracted. Three factors were extracted as a deliberate over-extraction strategy. As expected, the resulting third factor was inadequate, being loaded by six items of which four were complex, leaving only two items to uniquely identify the third factor. In contrast, the two-factor solution clearly identified ten items for each factor (see Table 1). Internal consistency reliability was strong, .84 (95% CI [.80, .87]) for the reading self-concept factor and .87 (95% CI [.84, .90]) for the value of reading factor.

Results for the reading self-concept and value of reading scales across grade level and sex are illustrated in Figure 2. There were too few students in several cells for a valid test across grade levels, but the correlation between grade and reading self-concept was -0.07 and between grade and the value of reading was -0.36 . Thus, reading motivation decreased as grade level increased. Additionally, males and females did not significantly differ on the reading self-concept scale ($t = 0.59$, $df = 531$, $p = .56$, $R^2 < .01$) but were statistically different in favor of females on the value of reading scale ($t = 4.29$, $df = 531$, $p < .001$, $R^2 = .04$).

Normative Study

Method

Instrument. Given the clear factor structure found in the calibration study, B-MRS data were collected and analyzed in a validation study.

Participants. A total of 2,136 Texas students (52% male) in grades 2 through 6 served as participants. By grade level, there were 301 students (53%

male) in grade 2, 269 students (54% male) in grade 3, 372 students (49% male) in grade 4, 588 students (51% male) in grade 5, and 606 students (53% male) in grade 6. No further demographic information on individual students was collected to protect participants' confidentiality.

Procedures. The names and work addresses of 1,000 randomly selected Texas teachers in grades 2-6 were purchased from a commercial marketing firm. Those 1,000 teachers were solicited via U.S. Mail to anonymously collect and share B-MRS data from their classrooms. Each solicitation letter contained a classroom supply of B-MRS forms and standardized instructions for data collection. Responses were received from 88 teachers who provided B-MRS data for 2,371 students in grades 1-8. The data of 2,136 students in 83 grade 2-6 classrooms who completed all 20 B-MRS items were retained for the validation study.

Analyses. Given theory and results of the calibration study, CFA was implemented with Mplus version 7.2 (Muthén & Muthén, 2014). Based on the ordered categorical data, polychoric correlations and the WLSMV estimator were selected (Lei & Wu, 2012). Overall model fit was evaluated with the CFI and RMSEA. Criteria for adequate model fit were $CFI \geq .90$ and $RMSEA \leq .08$ whereas good model fit was set at $CFI \geq 0.95$ and $RMSEA \leq 0.06$ (Hu & Bentler, 1999). Intraclass correlations for items ranged from .05 to .21 with a median of .09 indicating that non-independence of student data should be considered in the analyses (Muthén, 1997).

Results

A baseline model was established by comparing one- and two-factor within-student models without regard for nested data (Hox, 1995). The two-factor model was clearly superior to the one-factor model (see Table 2) although its overall fit was only adequate. Consequently, multilevel models with two within-student and one and two between-classroom factors were analyzed. All multilevel models exhibited good fit to the data but four residual item variances were negative in the model with two between-classroom factors, making that model inadmissible. Fewer factors are often found at the between level of multilevel models (Brown, 2013) so this result was not unusual. Thus, the two within-student and one

Table 1

Pattern Coefficients From An Exploratory Factor Analysis of the Baylor Revision of the Reading Survey (B-MRS) Among A Calibration Sample of 545 Students in Grades 1 Through 8

Item	Self-Concept	Value of Reading	h^2
1. My friends think I	.61	.23	.57
2. Reading a book	.26	.62	.61
3. I read	.57	.07	.36
4. My best friends think reading	-.06	.59	.32
5. Don't know a word	.59	-.02	.34
6. Tell friends about books	.13	.55	.38
7. Understand silent reading	.67	-.11	.39
8. People who read	-.08	.75	.51
9. I am	.77	.13	.70
10. I think libraries	-.12	.85	.64
11. I have trouble with reading	.75	-.19	.47
12. Knowing how to read	.14	.46	.29
13. Teacher question about reading	.46	.21	.36
14. I think reading	.10	.80	.72
15. Reading is	.77	-.04	.56
16. When I grow up	.02	.69	.49
17. Talk about reading assignments	.58	.08	.39
18. Want teacher to spend time on reading	-.03	.66	.43
19. When I read aloud	.51	.22	.41
20. When receive book as a present	.06	.74	.59

Note. Salient coefficients ($\geq .32$) in bold. h^2 = communality. Item stems abbreviated.

between-classroom factor model was the best fit to the data and is illustrated in Figure 4. Alpha coefficients for the reading self-concept and value of reading scales were both .87 with 95% CIs [.85, .89].

Reading self-concept and value of reading scores across grade level and sex are illustrated in Figure 3. Regression analyses were conducted using clustered robust standard errors within Stata 13 to adjust for non-independence of the data. For the reading self-concept scale, neither grade, sex, nor the grade by sex interaction were significant predictors ($p > .05$) with all three predictors combined accounting for less than 2% of the variance in reading self-concept. In contrast, both grade ($t = -5.55$, $df = 4$, $p < .001$, $R^2 = .11$) and sex ($t = 1.96$, $df = 1$, $p = .054$, $R^2 = .03$), but not the interaction of grade and sex ($p > .05$), were significant predictors of the value of reading

scale. The correlation between grade and the value of reading was -0.32 indicating that the perceived value of reading declined as grade level increased. The correlation between sex and the value of reading was 0.16 , indicating that girls tended to place higher value on reading than boys.

Norms. The original MRS lacks a representative normative sample, which is a "minimal requirement for using a test for diagnostic purposes" (Bear, Minke, & Manning, 2002, p. 423). Without a standardized, normative comparison, MRS scores are essentially uninterpretable for clinical use and do not allow advances in research on reading motivation. The lack of norms was seen as a specific weakness of the MRS by Fulmer and Frijters (2009), and other researchers have recommended the development of norms for the MRS (Kelley & Decker, 2009).

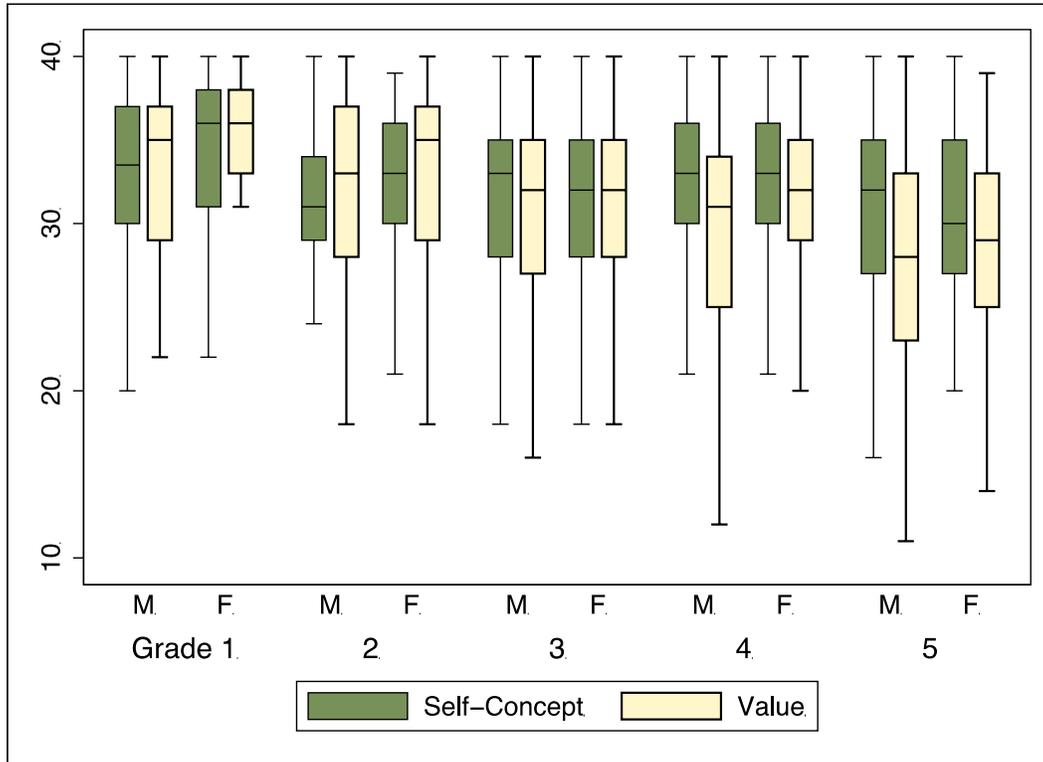


Figure 2. Reading Self-Concept and Value of Reading Scores on the Baylor Revision of the Motivation to Read Survey (B-MRS) for the Calibration Sample of 545 Male and Female Students in Grades 1 Through 5.

Table 2

Fit of Statistical Models to the Baylor Revision of the Reading Survey (B-MRS) Among A Texas Normative Sample of 2,136 Students in Grades 2 Through 6

Model	X ²	df	CFI	RMSEA
One Within-Student factor	4058.5	170	.831	.103
Two Within-Student factors	1666.9	169	.957	.064
Two Within-Student factors & One Between-Classroom factor	1262.6	339	.955	.036
Two Within-Student factors & Two Between-Classroom factors	1281.5	338	.954	.036

Note. CFI is the comparative fit index and RMSEA is the root mean square error of approximation.

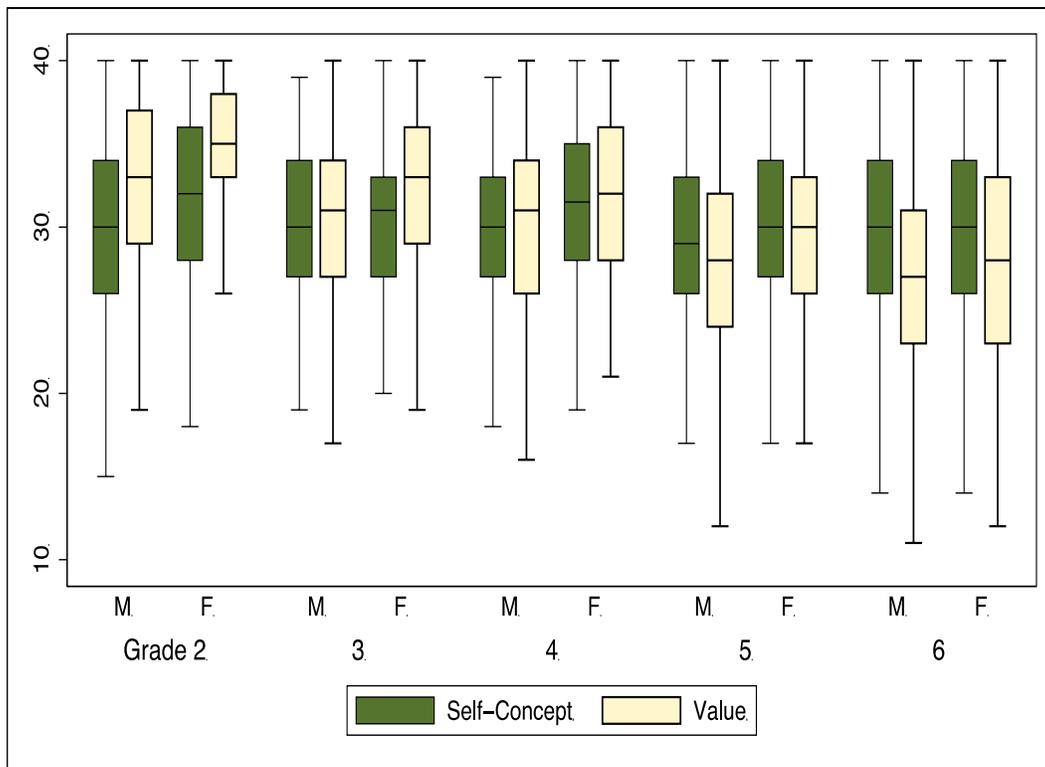


Figure 3. Reading Self-Concept and Value of Reading Scores on the Baylor Revision of the Motivation to Read Survey (B-MRS) for the Normative Sample of 2,136 Male and Female Texas Students in Grades 2 Through 6.

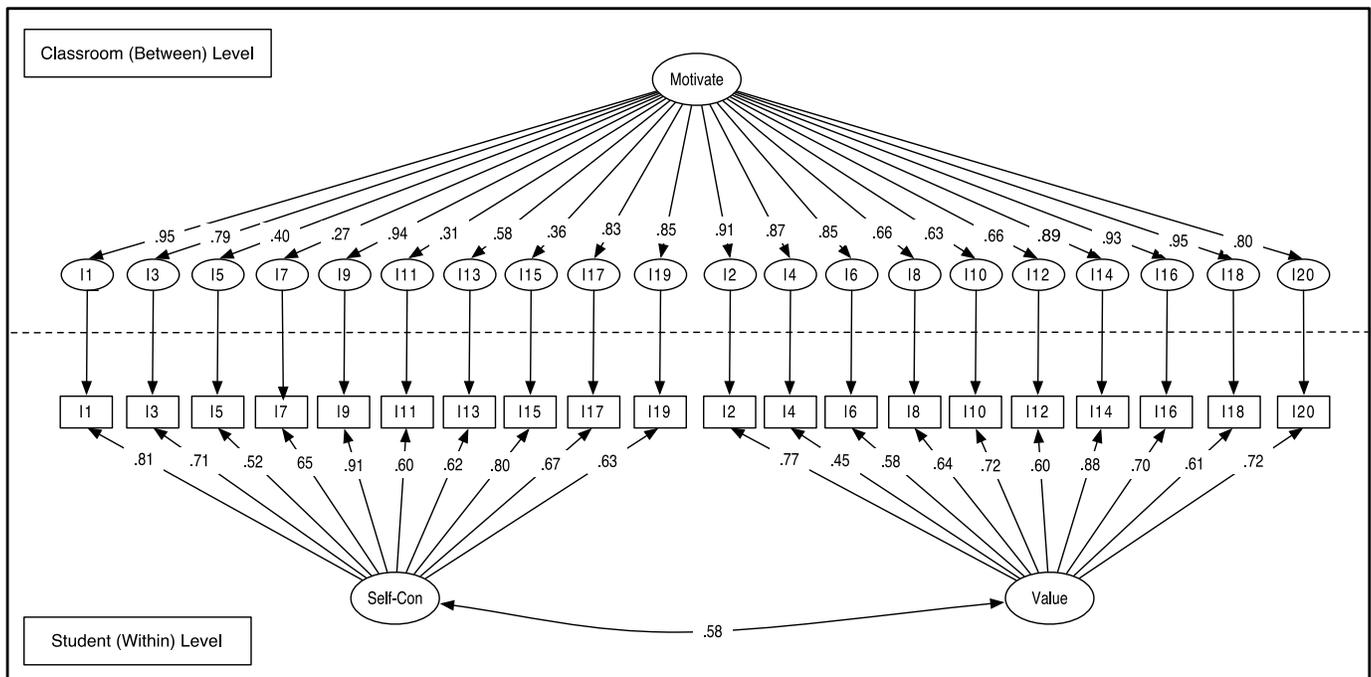


Figure 4. Multilevel structural model of the validation sample of 2,136 Texas students on the 20 items that comprise the Baylor Revision of the Motivation to Read Survey (B-MRS). Motivate is General Reading Motivation, Self-Con is Reading Self-Concept, and Value is Value of Reading.

Texas norms for the B-MRS were developed with the validation sample based on unit weighted raw scores (Bobko, Roth, & Buster, 2007; Wainer, 1976) and percentiles for their simplicity (Salvia, Yseldyke, & Bolt, 2010). Given the unequal number of males and females at each grade level, students' scores were weighted to achieve an overall sample size of 1,500 with 150 boys and 150 girls at each of the five grade levels. Separate norms tables were created for each grade level due to the major influence of grade level, especially on the value of reading scale. Norms tables as well as the B-MRS scale, standardized administration instructions, and score sheets can be freely downloaded from <http://edpsychassociates.com>.

Discussion

Although reading motivation has been recognized as important by both teachers and researchers, scales to measure reading motivation have, unfortunately, been of "poor construction and limited validation" (Fulmer & Frijters, 2009, p. 226). The structural validity of one promising measure of reading motivation, the Reading Survey (MRS) portion of the Motivation to Read Profile was investigated in the current study. Based on that initial investigation, the MRS was revised and its psychometric properties and structural validity examined in calibration and normative samples. The revised scale was found to measure two related ($r = .58$) reading motivation factors within students (reading self-concept and value of reading), both with good reliability ($\alpha = .87$), and one factor between classrooms. Thus, it appeared that students differentiated the value of reading from reading self-concept, and teachers unitarily influenced both facets of reading motivation (De Naeghel & Van Keer, 2013).

Female students in grades 2-6 exhibited more positive reading self-concept and value of reading scores than did male students. However, the male-female differences were small for both reading self-concept (less than 1% of variance) and value of reading (3% of the variance). Grade level accounted for less than 1% of the variance in reading self-concept but for 11% of the variance in the value of reading scale. Previous research with the MRS found similar patterns of scores by sex and grade level. That is, girls have tended to have a more positive reading self-concept and to value reading more than boys

while both reading self-concept and value of reading scores decreased as grade level increased (Archambault, Eccles, & Vida, 2010; Applegate & Applegate, 2011; Gambrell et al., 2011; Marinak & Gambrell, 2010; Retelsdorf, Schwartz, & Asbrock, 2014). Reading attitudes have also been found to be more positive for girls than boys and to decrease across grade levels (Kush & Watkins, 1996; McKenna, Conradi, Lawrence, Jang, & Meyer, 2012; McKenna, Kear, & Ellsworth, 1995). Thus, these affective patterns appear to be robust phenomena.

Strong structural validity evidence facilitates both research and practice (Kane, 2013) and should precede research on the relationships between constructs (Meehl, 1990). The current studies have provided strong structural validity evidence for the B-MRS. Thus, research on the relationship of reading self-concept and the value of reading with other theoretical constructs (e.g., reading achievement, reading attitudes, etc.) can now be conducted with these subscales serving as marker variables (Gorsuch, 1988).

Limitations

The biggest limitations of these studies were use of samples of convenience as well as the low response rate of Texas teachers with the resulting inability to judge the representativeness of the normative sample. Although 1,000 Texas teachers were randomly sampled, only 88 responded with B-MRS data from their classrooms. It is possible that the classrooms of these respondents were somehow non-representative. Additionally, lack of demographic information about individual participants makes it impossible to know if the students in the norm sample were representative of the state. Although validity may not be impacted by convenience samples (Mullinix, Druckman, & Freese, 2014), it would be advisable for users to supplement the B-MRS Texas norms with local norms.

Implications for Practice

It is widely accepted that motivation is involved in students' reading development (Afflerbach, Cho, Kim, Crassas, & Doyle, 2013), that reading failure has negative affective correlates (Morgan, Farkas, & Wu, 2012), and that interventions to improve reading

motivation and achievement may be most effective for younger children (Retelsdorf, Köller, & Möller, 2014). Fortunately, investigators (e.g., Baker, Scher, & Mackler, 1997; Edmunds & Bauserman, 2006; Guthrie et al., 2006; Malloy, Marinak, & Gambrell, 2010; Marinak, 2013; McRae & Guthrie, 2009; Meece & Miller, 1999; Monteiro, 2013; Wentzel & Wigfield, 2007; Wigfield, Guthrie, Tonks, & Perencevich, 2004) have identified home and school practices that improve student motivation to read. Several promising school practices were identified by Marinak (2013) who found that fifth grade teachers who offered structured read alouds, cooperative learning via jigsaws, and book club choices improved the perceived value of reading to their students. Other promising school interventions include cross-age peer tutoring, which has improved the reading motivation of both tutors and tutees (Monteiro, 2013) and the concept-oriented reading instruction program (Guthrie, McRae, & Klauda, 2007) that combines reading instruction with support for student motivation. Home practices that have been shown to improve reading motivation include shared storybook reading (Bus, van Ijzendoorn, & Pellegrini, 1995) and other family literacy activities that fostered active parent-child engagement (Yeo, Ong, & Ng, 2014). The B-RMS is a tool that teachers may now systematically apply (e.g., as described by Malloy et al., 2013) to target and monitor interventions that affect reading motivation, knowing that it has exhibited strong evidence of reliability and validity.

References

- Adams, M. J. (1990). *Beginning to read: Thinking and learning about print*. Cambridge, MA: MIT Press.
- Afflerbach, P. P., & Cho, B.-Y. (2011). The classroom assessment of reading. In M. L. Kamil, P. D. Pearson, E. B. Moje, & P. Afflerbach (Eds.), *Handbook of reading research* (Vol. IV, pp. 487-514). New York, NY: Routledge.
- Afflerbach, P., Cho, B.-Y., Kim, J.-Y., Crassas, M. E., & Doyle, B. (2013). Reading: What else matters besides strategies and skills? *The Reading Teacher*, *66*, 440-448. doi:10.1002/TRTR.1146
- Anderman, E. M., Gray, D. L., & Chang, Y. (2013). Motivation and classroom learning. In W. M. Reynolds & G. E. Miller (Eds.), *Handbook of psychology: Educational psychology* (2nd ed., Vol. 7, pp. 99-116). Hoboken, NJ: Wiley.
- Applegate, A. J., & Applegate, M. D. (2011). A study of thoughtful literacy and the motivation to read. *The Reading Teacher*, *64*, 226-234. doi:10.1598/RT.64.4.1
- Archambault, I., Eccles, J. S., & Vida, M. N. (2010). Ability self-concepts and subjective value in literacy: Joint trajectories from grades 1 through 12. *Journal of Educational Psychology*, *102*, 804-816. doi:10.1037/a0021075
- Baker, L., Scher, D., & Mackler, K. (1997). Home and family influences on motivations for reading. *Educational Psychologist*, *32*, 69-82. doi:10.1207/s15326985ep3202_2
- Bear, G. G., Minke, K. M., & Manning, M. A. (2002). Self-concept of students with learning disabilities: A meta-analysis. *School Psychology Review*, *31*, 405-427.
- Bobko, P., Roth, P. L., & Buster, M. A. (2007). The usefulness of unit weights in creating composite scores. *Organizational Research Methods*, *10*, 689-709. doi:10.1177/1094428106294734
- Brown, T. A. (2013). Latent variable measurement models. In T. D. Little (Ed.), *Oxford handbook of quantitative methods: Statistical analysis* (Vol. 2, pp. 257-280). New York, NY: Oxford University Press.
- Bus, A. G., van Ijzendoorn, M. H., & Pellegrini, A. D. (1995). Joint book reading makes success in learning to read: A meta-analysis on intergenerational transmission of literacy. *Review of Educational Research*, *65*, 1-21. doi:10.3102/00346543065001001
- Chamorro-Premuzic, T., Harlaar, N., Greven, C. U., & Plomin, R. (2010). More than just IQ: A longitudinal examination of self-perceived abilities as predictors of academic performance in a large sample of UK twins. *Intelligence*, *38*, 385-392. doi:10.1016/j.intell.2010.05.002
- Conradi, K., Jang, B. G., & McKenna, M. C. (2014). Motivation terminology in reading research: A conceptual review. *Educational Psychology Review*, *26*, 127-164. doi:10.1007/s10648-013-9245-z
- De Naeghel, J., & Van Keer, H. (2013). The relation of student and class-level characteristics to primary school students' autonomous reading motivation: A multi-level approach. *Journal of Research in Reading*, *36*, 351-370. doi:10.1111/j.1467-9817.2013.12000.x
- Eccles, J. (1983). Expectancies, values, and academic behaviors. In J. T. Spence (Ed.), *Achievement and achievement motives* (pp. 75-146). San Francisco, CA: Freeman.
- Edmunds, K., & Bauserman (2006). What teachers can learn about reading motivation through conversations with children. *The Reading Teacher*, *59*, 414-424. doi:10.1598/RT.59.5.1
- Edwards, J. R., & Bagozzi, R. P. (2000). On the nature and direction of relationships between constructs and measures. *Psychological Methods*, *5*, 155-174. doi:10.1037/1082-989X.5.2.155
- Flora, D. B., LaBrish, C., & Chalmers, R. P. (2012). Old and new ideas for data screening and assumption testing for exploratory and confirmatory factor analysis. *Frontiers in Psychology*, *3*(55), 1-21. doi:10.3389/fpsyg.2012.00055
- Ford, J. K., MacCallum, R. C., & Tait, M. (1986). The application of exploratory factor analysis in applied psychology: A critical review and analysis. *Personnel Psychology*, *39*, 291-314. doi:10.1111/j.1744-6570.1986.tb00583.x
- 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, 219-246. doi:10.1007/s10648-009-9107-x
- Gambrell, L. B., Hughes, E. M., Calvert, L., Malloy, J. A., & Igo, B. (2011). Authentic reading, writing, and discussion: An exploratory study of a pen pal project. *Elementary School Journal*, 112, 234-258. doi:0013-5984/2011/11202-0002
- Gambrell, L. B., Palmer, B. M., Codling, R. M., & Mazzoni, S. A. (1996). Assessing motivation to read. *The Reading Teacher*, 49, 518-533. doi:10.1598/RT.49.7.2
- Gorsuch, R. L. (1988). Exploratory factor analysis. In J. R. Nesselrode & R. B. Cattell (Eds.), *Handbook of multivariate experimental psychology* (2nd ed., pp. 231-258). New York, NY: Plenum.
- Gorsuch, R. L. (1997). Exploratory factor analysis: Its role in item analysis. *Journal of Personality Assessment*, 68, 532-560. doi:10.1207/s15327752jpa6803_5
- Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading, and reading disability. *Remedial and Special Education*, 7, 6-10. doi:10.1177/074193258600700104
- Graham, S., & Weiner, B. (1996). Theories and principles of motivation. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of educational psychology* (pp. 63-84). New York, NY: Macmillan.
- Graham, S., & Weiner, B. (2012). Motivation: Past, present, and future. In K. R. Harris, S. Graham, & T. Urdan (Eds.), *APA educational psychology handbook: Theories, constructs, and critical issues* (Vol. 1, pp. 367-397). Washington, DC: American Psychological Association.
- Guthrie, J. T. (2011). Best practices in motivating students to read. In L. M. Morrow & L. B. Gambrell (Eds.), *Best practices in literacy instruction* (4th ed., pp. 177-198). New York, NY: Guilford.
- Guthrie, J. T., & Coddington, C. S. (2009). Reading motivation. In K. R. Wentzel and A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 503-525). New York, NY: Routledge.
- Guthrie, J. T., McRae, A. C., & Klauda, S. L. (2007). Contributions of concept-oriented reading instruction to knowledge about interventions for motivations in reading. *Educational Psychologist*, 42, 237-250. doi:10.1080/00461520701621087
- Guthrie, J. T., Wigfield, A., Humenick, N. M., Perencevich, K. C., Taboada, A., & Barbosa, P. (2006). Influences of stimulating tasks on reading motivation and comprehension. *Journal of Educational Research*, 99, 232-245. doi:10.3200/JOER.99.4.232-246
- Hairrell, A., Rupley, W., & Simmons, D. (2011). The state of vocabulary research. *Literacy Research and Instruction*, 50, 253-271. doi:10.1080/19388071.2010.514036
- Hattie, J. (2012). *Visible learning for teachers: Maximizing impact on learning*. New York, NY: Routledge.
- Hidi, S., & Harackiewicz, J. M. (2000). Motivating the academically unmotivated: A critical issue for the 21st century. *Review of Educational Research*, 70, 151-179. doi:10.3102/00346543070002151
- Hox, J. J. (1995). *Applied multilevel analysis*. Amsterdam, The Netherlands: TT-Publikaties.
- Hu, L.-T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1-55. doi:10.1080/10705519909540118
- Hulme, C., & Snowling, M. J. (2011). Children's reading comprehension difficulties: Nature, causes, and treatments. *Current Directions in Psychological Science*, 20, 139-142. doi:10.1177/0963721411408673
- Kane, M. T. (2013). Validating the interpretations and uses of test scores. *Journal of Educational Measurement*, 50, 1-73. doi:10.1111/jedm.12000
- Kelley, M. J., & Decker, E. O. (2009). The current state of motivation to read among middle school students. *Reading Psychology*, 30, 466-485. doi:10.1080/02702710902733535
- Klauda, S. L., & Wigfield, A. (2012). Relations of perceived parent and friend support for recreational reading with children's reading motivations. *Journal of Literacy Research*, 44, 3-44. doi:10.1177/1086296X11431158
- Kush, J. C., & Watkins, M. W. (1996). Long-term stability of children's attitudes toward reading. *Journal of Educational Research*, 89, 315-319. doi:10.1080/00220671.1996.9941333
- LaBerge, D., & Samuels, S. J. (1974). Toward a theory of automatic information processing in reading. *Cognitive Psychology*, 6, 293-323. doi:10.1016/0010-0285(74)90015-2
- Lei, P.-W., & Wu, Q. (2012). Estimation in structural equation modeling. In R. H. Hoyle (Ed.), *Handbook of structural equation modeling* (pp. 164-180). New York, NY: Guilford.
- Linnenbrink, E. A., & Pintrich, P. R. (2002). Motivation as an enabler for academic success. *School Psychology Review*, 31, 313-327.
- Malloy, J. A., Marinak, B. A., & Gambrell, L. B. (Eds.). (2010). *Essential readings on motivation*. Newark, DE: International Reading Association.
- Malloy, J. A., Marinak, B. A., Gambrell, L. B., & Mazzoni, S. A. (2013). Assessing motivation to read: The motivation to read profile-revised. *The Reading Teacher*, 67, 273-282. doi:10.1002/TRTR.1215
- Marinak, B. A. (2013). Courageous reading instruction: The effects of an elementary motivation intervention. *Journal of Educational Research*, 106, 39-48. doi:10.1080/00220671.2012.658455
- Marinak, B. A., & Gambrell, L. B. (2008). Intrinsic motivation and rewards: What sustains young children's engagement with text? *Literacy Research and Instruction*, 47, 9-26. doi:10.1080/19388070701749546
- Marinak, B. A., & Gambrell, L. B. (2010). Reading motivation: Exploring the elementary gender gap. *Literacy Research and Instruction*, 49, 129-141. doi:10.1080/19388070902803795
- Marsh, H. W., Xu, M., & Martin, A. J. (2012). Self-concept: A synergy of theory, method, and application. In K. R. Harris, S. Graham, & T. Urdan (Eds.), *APA educational psychology handbook: Theories, constructs, and critical issues* (Vol. 1, pp. 427-458). Washington, DC: American Psychological Association.
- Marulis, L. M., & Neuman, S. B. (2013). How vocabulary interventions affect young children at risk: A meta-analytic review. *Journal on Research on Educational Effectiveness*, 6, 223-262. doi:10.1080/19345747.2012.755591

- McKenna, M. C., Conradi, K., Lawrence, C., Jang, B. G., & Meyer, J. P. (2012). Reading attitudes of middle school students: Results of a U.S. survey. *Reading Research Quarterly, 47*, 283-306. doi:10.1002/RRQ.021
- McKenna, M. C., Kear, D. J., & Ellsworth, R. A. (1995). Children's attitudes toward reading: A national survey. *Reading Research Quarterly, 30*, 934-956. doi:10.2307/748205
- McRae, A., & Guthrie, J. T. (2009). Promoting reasons for reading: Teacher practices that impact motivation. In E. H. Hiebert (Ed.), *Reading more, reading better* (pp. 55-76). New York, NY: Guilford.
- Meece, J. L., & Miller, S. D. (1999). Changes in elementary school children's achievement goals for reading and writing: Results of a longitudinal and an intervention study. *Scientific Studies of Reading, 3*, 207-229. doi:10.1207/s1532799xssr0303_2
- Meehl, P. E. (1990). Why summaries of research on psychological theories are often uninterpretable. *Psychological Reports, 66*, 195-244. doi:10.2466/pr0.1990.66.1.195
- Messick, S. (1995). Validity of psychological assessment: Validation of inferences from persons' responses and performances as scientific inquiry into score meaning. *American Psychologist, 50*, 741-749. doi:10.1037/0003-066X.50.9.741
- Möller, J., Pohlmann, B., Köller, O., & Marsh, H. W. (2009). A meta-analytic path analysis of the internal/external frame of reference model of academic achievement and academic self-concept. *Review of Educational Research, 79*, 1129-1167. doi:10.3102/0034654309337522
- Monteiro, V. (2013). Promoting reading motivation by reading together. *Reading Psychology, 34*, 301-335. doi:10.1080/02702711.2011.635333
- Morgan, P. L., Farkas, G., & Wu, Q. (2012). Do poor readers feel angry, sad, and unpopular? *Scientific Studies of Reading, 16*, 360-381. doi:10.1080/10888438.2011.570397
- Morgan, P. L., & Fuchs, D. (2007). Is there a bidirectional relationship between children's reading skills and reading motivation? *Exceptional Children, 73*, 165-183. doi:10.1177/001440290707300203
- Murphy, P. K., & Alexander, P. A. (2000). A motivated exploration of motivation terminology. *Contemporary Educational Psychology, 25*, 3-53. doi:10.1006/ceps.1999.1019
- Mullinix, K., Druckman, J., & Freese, J. (2014). *The generalizability of survey experiments* (Working Paper #14-19). Evanston, IL: Northwestern University Institute for Policy Research.
- Muthén, B. O. (1994). Multilevel covariance structure analysis. *Sociological Methods & Research, 22*, 376-398. doi:10.1177/0049124194022003006
- Muthén, B. O. (1997). Latent variable modeling of longitudinal and multilevel data. *Sociological Methodology, 27*, 453-480. doi:10.1111/1467-9531.271034
- Muthén, B. O., & Muthén, L. K. (2014). *Mplus user's guide* (7th ed.). Los Angeles, CA: Muthén & Muthén.
- National Center for Education Statistics. (2013). *The nation's report card: A first look: 2013 mathematics and reading* (NCES 2014-451). Retrieved from <http://nces.ed.gov/nationsreportcard/subject/publications/main2013/pdf/2014451.pdf>
- Neuhard, R. (2004). *Examining the factor structure of the Motivation to Read Profile among a sample of elementary school students* (Unpublished master's thesis). Pennsylvania State University, State College, PA.
- O'Flahavan, J., Gambrell, L. B., Guthrie, J. T., Stahl, S., & Alvermann, D. (1992). Poll results guide activities of research center. *Reading Today, 9*(5), 12.
- Paris, S. G., & Oka, E. R. (1986). Self-regulated learning among exceptional children. *Exceptional Children, 53*, 103-108.
- Perfetti, C., & Stafura, J. (2014). Word knowledge in a theory of reading comprehension. *Scientific Studies of Reading, 18*, 22-37. doi:10.1080/10888438.2013.827687
- Piasta, S. B., & Wagner, R. K. (2010). Developing early literacy skills: A meta-analysis of alphabet learning instruction. *Reading Research Quarterly, 45*, 8-38. doi:10.1598/RRQ.45.1.2
- Pintrich, P. R., & Schunk, D. H. (2002). *Motivation in education: Theories, research, and application* (2nd ed.). Englewood Cliffs, NJ: Merrill/Prentice Hall.
- Pitcher, S. M., Albright, L. K., DeLaney, C. J., Walker, N. T., Seunarine Singh, K., Mogge, S., ... & Dunston, P. J. (2007). Assessing adolescents' motivation to read. *Journal of Adolescent & Adult Literacy, 50*, 378-396. doi:10.1598/JAAL.50.5.5
- Quirk, M., Schwanenflugel, P. J., & Webb, M.-Y. (2009). A short-term longitudinal study of the relationship between motivation to read and reading fluency skill in second grade. *Journal of Literacy Research, 41*, 196-227. doi:10.1080/10862960902908467
- R Development Core Team. (2014). *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing. Available from <http://www.R-project.org>.
- Rayner, K., Foorman, B. R., Perfetti, C. A., Pesetsky, D., & Seidenberg, M. S. (2001). How psychological science informs the teaching of reading. *Psychological Science in the Public Interest, 2*, 31-74. doi:10.1111/1529-1006.00004
- Retelsdorf, J., Köller, O., & Möller, J. (2014). Reading achievement and reading self-concept – Testing the reciprocal effects model. *Learning and Instruction, 29*, 21-30. doi:10.1016/j.learninstruc.2013.07.004
- Retelsdorf, J., Schwartz, K., & Asbrock, F. (2014, June 16). "Michael can't read!" Teachers' gender stereotype and boys' reading self-concept. *Journal of Educational Psychology*. Advance online publication. <http://dx.doi.org/10.1037/a0037107>
- Runge, T. (1998). *Phonemic awareness skills of preschool children* (Unpublished master's thesis). Pennsylvania State University, State College, PA.
- Salvia, J., Ysseldyke, J. E., & Bolt, S. (2010). *Assessment in special and inclusive education* (11th ed.). Belmont, CA: Wadsworth.
- 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*, 427-463. doi:10.1002/RRQ.030
- Schunk, D. H. (2000). Coming to terms with motivation constructs. *Contemporary Educational Psychology, 25*, 116-

119. doi:10.1006/ceps.1999.1018
- Slavin, R. E., Lake, C., Chambers, B., Cheung, A., & Davis, S. (2009). Effective reading programs for the elementary grades: A best-evidence synthesis. *Review of Educational Research*, 79, 1391-1466. doi:10.3102/0034654309341374
- Snow, C. E., Burns, M. S., & Griffin, P. (1998). *Preventing reading difficulties in young children*. Washington, DC: National Academy Press.
- Snowling, M. J., & Hulme, C. (2011). Evidence-based interventions for reading and language difficulties: Creating a virtuous circle. *British Journal of Educational Psychology*, 81, 1-23. doi:10.1111/j.2044-8279.2010.02014.x
- Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly*, 21, 360-407. doi:10.1598/RRQ.21.4.1
- The Nation's Report Card. (2012). *Reading 2011: National assessment of educational progress at grades 4 and 8* (NCES 2012-457). Washington, DC: U. S. Department of Education.
- Uguroglu, M. E. & Walberg, H. J. (1979). Motivation and achievement: A quantitative synthesis. *American Educational Research Journal*, 16, 375-389. doi:10.3102/00028312016004375
- Wainer, H. (1976). Estimating coefficients in linear models: It don't make no nevermind. *Psychological Bulletin*, 83, 213-217. doi:10.1037/0033-2909.83.2.213
- Watkins, M. W., & Coffey, D. Y. (2004). Reading motivation: Multidimensional and indeterminate. *Journal of Educational Psychology*, 96, 110-118. doi:10.1037/0022-0663.96.1.110
- Wentzel, K. R., & Wigfield, A. (2007). Motivational interventions that work: Themes and remaining issues. *Educational Psychologist*, 42, 261-271. doi:10.1080/00461520701621103
- Wigfield, A., Guthrie, J. T., & McGough, K. (1996). *A questionnaire measure of children's motivations for reading* (Instructional Resource No. 22). Athens, GA: National Reading Research Center, University of Georgia and University of Maryland.
- Wigfield, A., Guthrie, J. T., Tonks, S., & Perencevich, K. C. (2004). Children's motivation for reading: Domain specificity and instructional influences. *Journal of Educational Research*, 97, 299-309. doi:10.3200/JOER.97.6.299-310
- Yeo, L. S., Ong, W. W., & Ng, C. M. (2014). The home literacy environment and preschool children's reading skills and interest. *Early Education and Development*, 25, 791-814. doi:10.1080/10409289.2014.862147c
- Young, D. (2000). *A construct validity study of the Motivations for Reading Questionnaire* (Unpublished master's thesis). Pennsylvania State University, State College, PA.