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Assessing Situated Reading Motivations Across Content Areas: A Dynamic Literacy Motivation Instrument

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Abstract

While educators and researchers agree on the crucial role of literacy motivation for performance, research on methods for accurately assessing adolescent reading motivation is still uncommon. The most used reading motivation instruments do not attend to the multiple content areas in which adolescents read. The present study examines a new content-area sensitive measure of reading motivation. One hundred forty middle school students across content-area classrooms participated. Exploratory factor analysis was used to examine the factor structure of this measure, and associations among existing measures, social aspects of literacy events, and teacher-rated content-area reading performance were explored to examine the validity and utility of this measure for classroom practice. Educational implications include the potential for teachers to adapt instruction based on students' content-area-specific reading motivations.

Keywords

reading/literacy, middle school, content-area assessment

Adolescents face more sophisticated literacy demands than their elementary school peers (Biancarosa & Snow, 2006). Schools expect that adolescents will engage in reading for a variety of purposes across content areas, for example, to participate in a group discussion of story structure or complete a science experiment (Shanahan & Shanahan, 2008). A major component of successful reading across these diverse literacy tasks is students' motivation to engage with text in different and specific ways (Buehl, 2011). Knowledge of students' motivation to read, defined broadly "as students' beliefs, values, and goals related to reading" (Guthrie & Klauda, 2014, p. 392), can inform instructional routines and choices, with cumulative benefits for reading achievement (Gambrell, 2011).

While educators and researchers agree on the crucial role of literacy motivation in reading performance, research on methods for accurately and validly assessing the reading motivation of adolescents is still uncommon (Davis, Tonks, Rodriguez, & Hock, 2015; McKenna, Conradi, Lawrence, Jang, & Meyer, 2012). The most frequently used instruments for measuring reading motivation do not attend to content-area-specific reading motivations and instead assess reading motivation as a more general construct (Schiefele, Schaffner, Möller, & Wigfield, 2012), with little sensitivity to the distinct reading activities students engage in across the disciplines (Buehl, 2011). The most common reading motivation measure, the Motivations for Reading Questionnaire (MRQ), asks questions regarding students' motivational beliefs about reading, such as whether a student agrees with the statement, "I am a good reader," as well as motivational values about reading, such as "It is very important to me to be a good reader" and reading goals, such as "I read to improve my grades" (Wigfield & Guthrie, 1997, pp. 431–432).Such instruments provide important information about more habitual (i.e., general and relatively stable) motivations for reading broadly and include a range of motivation constructs (i.e., beliefs, values, and goals), but they do not assess student reading motivation for more situated literacy events, defined as "occasions in which written language is integral to the nature of participants' interactions and their interpretive processes and strategies" (Heath, 1986, p. 98) that occur in the context of content-area-specific reading. The absence of a content-area-specific focus in these measures stands in contrast to the Common Core State Standards (CCSS; National Governors Association Center for Best Practices and Council of Chief State School Officers, 2010), which recognize that reading within a content area involves unique reading demands and, by extension, unique motivations.

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Motivation Conceptualizations and Adolescent Literacy Frameworks

In response to the demand for instruments tailored to capture the reading experience of adolescents (see McKenna et al., 2012), reading motivation measurement scholars have amended existing questionnaires intended for elementary students to better suit older readers (Boltz, 2010; Guthrie, Wigfield, & Klauda, 2012; Pitcher et al., 2007), adapting questionnaire items to reflect more developmentally appropriate language (Boltz, 2010; Gambrell, Palmer, Codling, & Mazzoni, 1996; Pitcher et al., 2007) and including item content that addresses more extensive text types, such as expository text (Guthrie, Cambria, & Wigfield, 2009; Guthrie et al., 2012) and digital reading (McKenna et al., 2012). Yet, these items do not address distinctions between different content areas within school settings.

A more sensitive assessment of reading motivation tailored to adolescent reading might be more closely aligned with widely accepted conceptualizations of reading motivation and comprehension that recognize that adolescents' reading experiences are influenced by the content-area classroom context. Thus, the present study aimed to design, validate, and explore the utility of a new daily content-area sensitive measure of reading motivation, the Dynamic Reading Motivation Measure (DRMM), for middle school students (see the appendix). Below, we review aspects of reading motivation theory and describe frameworks for understanding adolescent reading that informed the design of the DRMM.

Conceptualizations of Motivation That Inform the DRMM

The focus of the present study on content-area reading motivation is driven by distinctions in the motivation literature between domain-general and domain-specific motivation constructs (Harter, 1982; Schiefele et al., 2012): A student may report being a motivated learner overall (domain-general), or a student may report being motivated to learn specific scientific concepts, but not be particularly motivated to learn in math class (domain-specific; Deci, 1992). Domain-specific motivation constructs include students' motivations for a subject area or activity (e.g., sports or music), while domain-general motivation constructs include more broad motivations such as students' goals for their achievement overall (Schiefele et al., 2012; Wigfield, 1997). Existing domain-specific instruments vary in their focus and degree of specificity, with measures that assess students' *content-area-specific* motivations (Nurmi & Aunola, 2005; Schiefele et al., 2012) and other measures that assess students' *reading-specific* motivations (e.g., Retelsdorf, Köller, & Möller, 2011; Schaffner & Schiefele, 2008; Wigfield & Guthrie, 1997). In this study, we investigated the intersection of reading-specific and content-specific motivations, given research indicating that a necessary ingredient for successful subject area reading is motivation to engage in reading in discipline-specific ways (Shanahan & Shanahan, 2008).

Reading-specific measures are widely used in the literature, yet existing work demonstrates that some students who score high on positive motivations for reading overall, still score low on content-area reading performance (Guthrie & Klauda, 2014). The development of a measure that assesses content-area reading motivations provides a potential opportunity to explicate the factors contributing to this divergence, by investigating how more circumscribed understandings of motivation to read during discipline-specific reading may explain student performance beyond more general motivation domains, that is, reading-specific or content-area-specific motivations alone.

A second distinction that influences the design of the DRMM is research explicating the difference between *habitual* and *situated* motivation (see Note 1; Schiefele et al., 2012). Habitual motivation describes the relatively stable motivation of a student to engage in (reading) activities. Measures of habitual reading motivation ask students to report on their motivation to read in general (i.e., not in relation to a specific reading event) and are usually administered on a single occasion or in the fall and spring of the academic school year (Wigfield & Guthrie, 1997). By contrast, situated reading motivations reflect a specific literacy event, and thus are specific to a reading situation and text.

Situated understandings of reading motivation are far less common in the reading motivation literature. The few studies that have examined student subject area motivation and reading focus on habitual understandings of motivation. For example, work by Moje, Overby, Tysvaer, and Morris (2008) explored students' motivations in each content area and their beliefs about particular content-area texts, with items such as "How much do you like doing Social Studies?"—an item that addresses the domain of social studies, but not attitudes about reading in social studies classrooms—and "How good are you at reading your English textbook?" with students asked to think about how they felt over the past year. Such items capture students' content-area motivation (i.e., motivation for social studies, English, math, and science) and habitual motivations for reading, where students must aggregate their motivation for different text types and activities (e.g., textbooks, lectures, vocabulary) across the past year. Similarly, a survey focused solely on habitual reading motivation in English language arts (ELA), the Adolescent Motivations for School Reading (AMSR) Questionnaire (Coddington, 2009), asks students to report on how they felt over the course of the school year in ELA, but not in relationship to specific daily literacy events.

These two habitual content-area measures have not been widely adopted by teachers, with one explanation being that

assessment items do not specifically address motivations to read during content-area literacy events (Davis et al., 2015). The AMSR and the questionnaire created by Moje and colleagues, capture important information about students' feelings about text types and content-area activities broadly, important insight for teachers and administrators eager to pinpoint areas where students struggle. However, a more situated understanding is equally essential for responsive instruction. That is, while students may not be particularly motivated to engage with social studies texts (as measured by the habitual motivation measure mentioned), the stipulation by the CCSS is that they will need to read these texts to be prepared for college reading. A measure is necessary that will help teachers determine under what circumstances students are motivated to engage with certain texts during specific activities and adjust their instruction accordingly.

Of the many constructs in the motivation literature, we chose to assess a construct strongly linked to students' reading frequency and comprehension (Wigfield & Guthrie, 1997): *intrinsic motivation to read*, being motivated to engage in a reading activity for its own sake, or because of one's curiosity or interest (Murphy & Alexander, 2000). Existing research has shown that intrinsic motivation constructs are positively associated with student reading comprehension (Baker & Wigfield, 1999; Unrau & Schlackmann, 2006). Intrinsic reading motivation is the most prevalent target of interventions to increase reading motivation and is measured in the most commonly used instrument of reading motivation (the MRQ), using subscales of Curiosity and Involvement (Guthrie, Wigfield, & Perencevich, 2004). Furthermore, the construct of intrinsic motivation includes both situational and habitual components (Deci, 1992). However, to date, the more situated understanding of intrinsic reading motivation is rarely used in the quantitative survey literature (S. R. Neugebauer, 2013). A situated measure of intrinsic content-area reading motivation would likely be uniquely informative for performance, given that motivation models predict that situated motivation (see Note 2) will vary regardless of a reader's habitual motivation (Hidi & Harackiewicz, 2000).

Of the few studies that have compared intrinsic situated and habitual reading motivations, a study that explored constructs in the MRQ and their corresponding situated motivation constructs (derived from interview questions) found a correlation of .31 (Guthrie, McRae, & Klauda, 2007), providing supporting evidence of the related and yet distinctiveness of these two intrinsic motivation constructs. We hypothesized that if a habitual intrinsic reading motivation measure were modified to capture situated daily intrinsic reading motivations in the content areas, this measure would address constructs related to habitual items (capturing intrinsic motivations to read) at least to some degree, but that this measure would also capture a unique situated construct (intrinsic motivations in situ).

Figure 1 provides a conceptual model of how the present measure is theorized to relate to existing measures of motivation, as well as its potential relationship to content-area reading performance. In this conceptual model, the horizontal division highlights how the present measure is distinct from previous measures. That is, commonly used existing measures capture habitual motivations (the bottom rectangle) while the present measure captures situated motivations (the upper rectangle) that are influenced by *daily texts and activities* used in content-area classrooms. The two large shaded circles in the conceptual model represent the two domains captured in existing measures: *content-area-specific* motivations (the large shaded circle on the left) or *reading-specific* motivations (the large lightly shaded circle on the right). The DRMM is intended to capture the intersection of these two, the more fine-grained domain of content-area reading motivation, and is thus represented in the overlap between these two large shaded circles. The shading also makes evident that content-area reading performance, similar to content-area reading motivation, measures a construct that is both reading- and content-area-specific, and therefore, is hypothesized to demonstrate a positive association, above and beyond habitual measures, with the DRMM.

Adolescent Literacy Frameworks That Inform the DRMM

The potential utility of this situated and domain-specific measure is conceptualized within an adolescent literacy framework. In the field of adolescent literacy, the common view of reading comprehension involves a dynamic process of extracting and constructing meaning from text (Moje, Dillon, & O'Brien, 2000). This interactive process includes a transactional relationship among the text, reader, and context. The reading context is "realized by the constraints of task, purpose and situation" (Tierney & Pearson, 1992, p. 86) and, as such, is referred to in related interactive conceptualizations of reading comprehension as "activity" (RAND Reading Study Group, 2002). Thus, we use the term "activity" to refer more generally to the "constraints of the task, purpose, and situation" of specific content-area literacy events. The elements of this interactive model of reading comprehension (i.e., the reader, text, and activity) can be used to explain whether and how students come to comprehend texts, and also how certain factors explain students' motivations for reading text. Critical features of this interactive model are described in more detail next.

Reader

Motivation may be seen as a characteristic of the reader, with habitual and situated understandings of motivation influencing a reader's affect toward reading. For example, a student who does not see himself or herself as a mathematical thinker

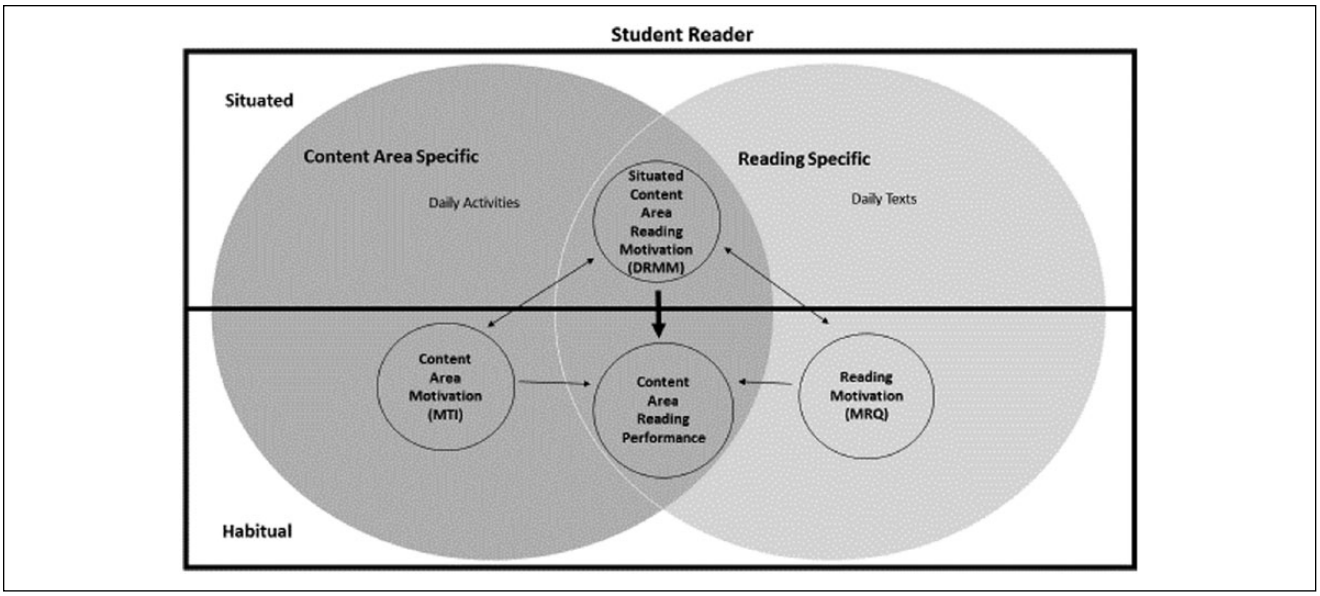

Figure 1. Conceptual model of the theorized relationships between the DRMM and other related motivation measures and constructs.

Note. The outer rectangle represents the reader, with motivation being considered a characteristic of the reader and thus contained within this larger rectangle. The two smaller rectangles denote the two different types of motivation captured in this study, habitual (stable) motivations and situated (situation-specific) motivations. The two large shaded circles denote the two commonly captured domains in motivation measures, reading-specific or content-area-specific motivation. The smaller circles represent the constructs of interest in the present study as well as the corresponding measures that operationalize these constructs. Daily activities (which reflect content-area tasks and purposes) and daily texts (which reflect selected texts and corresponding reading aims) compose the literacy event and thus are contained in the situated rectangle. The arrows represent theorized relationships that are tested in the present investigation. Research Question 3 explores the bidirectional arrows between the habitual measures of motivation and the DRMM and Research Question 5 examines the arrows between all motivation measures and content-area reading performance. It is likely that the arrows between all the motivation measures and the performance outcome are bidirectional, however, the present analysis only explores the predictive power of the motivation measures for content-area performance, and thus only one-directional arrows are displayed. DRMM = Dynamic Reading Motivation Measure.

may avoid engaging with dense word problems, but a personally relevant mathematical problem may energize her to actively engage with the text (Buehl, 2011). In contrast, the two additional factors in this transactional relationship, texts and activities, largely vary as a function of teachers' daily planned instruction (Gambrell, 2011).

Daily Texts

The content and difficulty of the text chosen daily is central to motivated reading in content-area classrooms (Gambrell, 2011). Students with more autonomy in choosing texts and who have texts appropriately matched to their reading levels are more likely to expend effort trying to understand those texts, comprehend better, and exhibit more motivation than their peers not provided with text choices or an appropriate text–reader match (Guthrie et al., 2007).

Daily Activities

The way that students and teachers work with each other based on teacher-directed purposes and outcomes, also influence students' level of reading motivation. A highly cited example of activity-related aspects of reading that specifically influence motivation, includes social interactions during reading activities (Gambrell, 2011), with a growing body of research supporting the positive association of social interactions and intrinsic reading motivation across different content areas (Moje et al., 2000).

The DRMM assessment captures these various interacting aspects of a literacy event, in that it includes items that assess the text and reader interaction, and records the social context of the reading activity as well as the texts being read (see Figure 2).

In examining this interactive view of reading, we hypothesized that a more situated understanding of reading motivation would be more sensitive to activity-related aspects of literacy events. To test the sensitivity of this measure and to assess its validity, we examined whether the presence of more social reading activities and positive social interactions during reading would be associated with higher DRMM scores.

The Present Study

Despite wide acceptance in the literature of an interactive framework of adolescent reading comprehension, a more

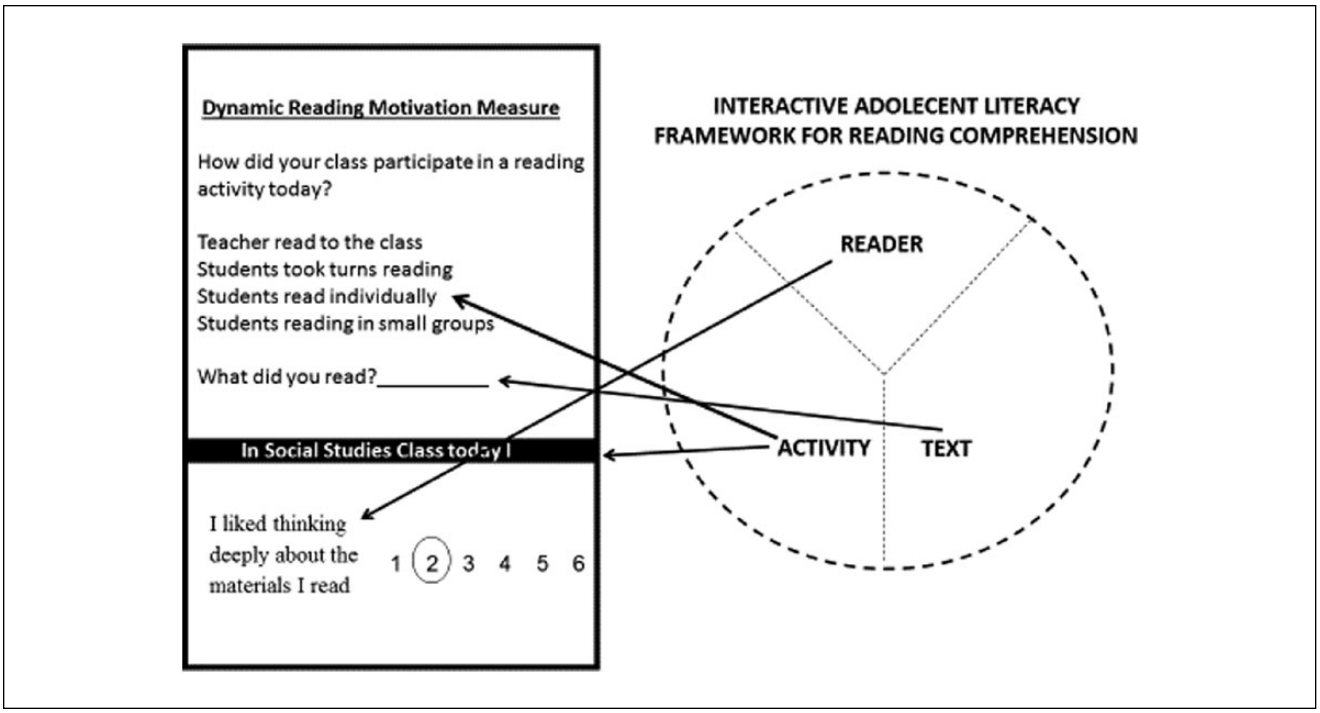

Figure 2. Diagram mapping the relationship between the different factors that compose an interactive view of adolescent reading and items on the DRMM.
Note. DRMM = Dynamic Reading Motivation Measure.

situated, dynamic understanding of reading has not been operationalized in motivation assessments. To date, no reading motivation instruments assess situated reading motivations in content areas (S. R. Neugebauer, 2013). The DRMM aims to address this absence, and therefore requires measurement validation. The following questions guided the exploration of the validity, reliability, and utility of this novel measure.

Psychometric Questions:
Research Question 1 (RQ1): What is the factor structure of the DRMM (i.e., do novel factors emerge in this situated context)?
Research Question 2 (RQ2): Is the DRMM a reliable measure across multiple administrations?
Validity Questions:
Research Question 3 (RQ3): Is the DRMM distinct from a habitual reading motivation measure and a measure of subject area interest?
Research Question 4 (RQ4): Do students in classrooms with more group reading activities and positive social interactions during reading have higher DRMM scores?
Utility Question:
Research Question 5 (RQ5): Are students' DRMM scores positively associated with their content-area reading performance?

Method

One hundred forty students in 15 mathematics, science, social studies, and ELA classrooms participated (nine ELA teachers, three math teachers, one social studies teacher, and two science teachers) in the study across three urban Northeastern schools. All students across classrooms were asked to participate in the study, with 211 students recruited. Participating students were assessed in only one content-area classroom, permitting the collection of unique cases of DRMM data, but limiting the number of students that could be included in a given content-area classroom. While, not all 211 students consented for the present study, those students who did consent represent a relatively normal distribution of reading abilities, based on teacher ratings and levels of habitual motivation to read.

Participating students were 68% female, 40% White, 20% Black, 34% Hispanic, and 6% Asian. All students were in middle school, with 45% in sixth grade, 21% in seventh grade, and 34% in eighth grade. This project focuses on middle school because this period comprises a transition in the organization of schools, for example, shift to multiple classrooms (Eccles et al., 1993), rendering it a particularly strategic phase for studying content-area-specific reading motivations.

To determine whether our sample included a range of reading abilities, teacher ratings of student reading skills

were collected. Research demonstrates that teacher judgments of student performance in a targeted area are robustly correlated with students' actual performance on criterion measures (Hoge & Coladarci, 1989) and thus were used to determine students' reading ability. In response to the question "What is the quality of this student's reading skills?" teachers reported that 5% of students' reading skills were poor, 20% were fair, 34% were average, 24% were above average, and 17% were excellent. Ten percent of the sample was receiving special education services. Consistent with national urban teacher demographics, teachers were less diverse with regard to race and ethnicity than the students (Dilworth & Coleman, 2014), with 86% White, 7% Black, and 7% "Other," and 33% male.

Measures

To explore issues of convergent and divergent validity, several related affective measures were assessed (i.e., habitual measures of intrinsic reading motivation and subject area interest).

We also examined the relationship between DRMM scores and social aspects of the literacy event. Consistent with the literature on social interactions augmenting student motivation, we examined the potential positive associations among students' reports of engaging in social reading activities (e.g., reading group work) and DRMM scores, as well as teacher and observer reports of positive classroom social interactions during literacy events. Validation of reading constructs requires alternative methods of measuring reading behavior beyond self-reports (Schiefele et al., 2012). We triangulated the data across raters (students, teachers, and observers), to more comprehensively capture the nature of observed classroom literacy events and their relationship to DRMM scores.

To explore the utility of the DRMM, a measure of students' content-area reading performance based on teacher ratings was also collected. Teacher content-area reading ratings were more appropriate, germane, and feasible than measuring students' actual performance in the context of the present study, where formative assessments being collected across subject areas diverged with regard to type of reading activity, number of items, and assessment format. Of interest was the relationship between the target content-area sensitive measure and content-area-specific reading performance, making standardized general reading outcomes less relevant for our more circumscribed investigation of disciplinary reading. For this study, teacher ratings provided a direct, specific, and consistent means of assessing students' performance across content areas.

Motivation Measures

MRQ. The MRQ is the most commonly used measure of habitual reading motivation (Mucherah & Yoder, 2008), and is a reliable and valid instrument of reading motivation, that is, $\alpha = .60$ to .80 across scales (Wigfield & Guthrie, 1997). Its 53 items are rated on a 4-point Likert-type scale from *very different from me* to *a lot like me*. For the present investigation, the two constructs of intrinsic motivation, involvement (six items) and curiosity (six items), were explored, as these subscales represent the target constructs for the DRMM and are predictive of reading comprehension (Guthrie et al., 2004).

DRMM. The DRMM was composed of items drawn from the literature on intrinsic motivation with item content derived from the intrinsic motivation items in the MRQ with language altered, based on the suggestions of Boltz (2010) and Pitcher and colleagues (2007) to be more appropriate for middle school students, and to be suitable for daily administrations. Items from the MRQ that referred to a specific type of text were not adapted for this measure, as they would not facilitate comparisons across content-area classrooms (e.g., "I like mysteries," "I read a lot of adventure stories"). Items in the DRMM assess a specific content area with an initial prompt (e.g., "In science class today"), followed by items applicable across content areas (e.g., "I wanted to learn more about the topic I was reading about"), with 4-point Likert-type scale response options (*not at all true for me* to *completely true for me*). Students also answered questions about the type of reading activity they engaged in during class that day (e.g., individual student reading, small group, teacher led) and type of text.

A two-step qualitative review process was conducted to explore the validity of these items (Gable & Wolf, 1993). The original instrument was circulated to five experts in reading motivation research to review the correspondence between the conceptual and operational definitions of the target motivation constructs. The composition of experts provided both a breadth and depth of expertise, was aligned with identification criteria for experts described by McKenzie, Wood, Kotecki, Clark, and Brey (1999), and permitted objective feedback, as no expert was researching situated content-area reading motivation, which represents the intersection of the expertise of the selected reviewers. Experts were provided with a content validation form that included short descriptions of the two hypothesized constructs and potential items for review and indicated which construct they believed the item belonged to, how confident they were that the item belonged to the category selected, and how relevant they believed the item was to the construct (Gable & Wolf, 1993). Experts were also encouraged to comment on the item wording and clarity. Items flagged by more than one expert as problematic were removed or reworded; an item flagged by only one reviewer was retained. For example, Item 8, "I created pictures in my mind while I thought about the texts," was considered by one reviewer to be too closely related to reading

strategies (e.g., visualizing). However, for other reviewers this item was central to the construct of involvement, which captures the feeling of being completely immersed in a reading activity, with two reviewers referencing "flow" experience (Csikszentmihalyi, 1978), where students lose track of time when they are completely absorbed in a text. For Item 13, one reviewer felt that the dual components of Item 13, "enjoyed reading" and "not want to stop" should be separated out into two separate items, while another reviewer commented that these two parts needed to be coupled to more precisely capture the construct of involvement, which is a positive motivation (e.g., you could want to keep reading because you do not want to participate in other classroom activities, but not because you are enjoying reading per se). We retained these items in the administered survey to see empirically whether these items would map onto our constructs in practice. After items were retained or removed based on the first panel's recommendations, a second panel of eight reading researchers reviewed the revised item stems, as well as the format of the instrument for student-friendliness. Only visual format changes were recommended by the second review panel. The DRMM was administered by research assistants at the end of each class period, with students given 7 to 10 min to fill it out.

Measure of Topic Interest (MTI). The MTI assesses students' individual interest in a topic area. It has been used in past research (Schiefele, 1996), and was amended in the present study to explore students' interest in ELA, math, science, and social studies. The sole alteration to the items was substituting the phrase "this subject" for the actual subject area. The MTI also used a Likert-type scale with four response options (*not at all true for me* to *completely true for me*). This measure was found to be valid and reliable in previous studies and reliable in the present study ($\alpha = .89$). The MTI was included in this study because it provides an assessment of students' interest in the content area, separate from their motivation to read in the content area (assessed by the DRMM).

Social Aspects of Literacy Activities

Positive social reading interactions. To assess students' positive social interactions during reading events, Direct Behavior Ratings (DBRs) were employed. These brief ratings of student behavior (Chafouleas, Riley-Tillman, & Sugai, 2007) use a 0 to 10 scale. DBR ratings were completed by the teacher at the end of the approximately 40-min class period. Teachers reported on a randomly selected 7 to 10 students to reduce teacher burden (Chafouleas et al., 2007). Of central focus was the DBR Respectful Behavior subscale. This construct includes following teacher direction, engaging in prosocial interaction with peers, providing positive responses to adult request, and verbal or physical disruption without a negative tone/connotation. This subscale of the DBR has undergone extensive testing and validation and has been found to demonstrate excellent reliability, $\alpha = .91$ (Chafouleas, Sanetti, Kilgus, & Maggin, 2012) and an acceptable level of test–retest reliability in the present study of $\alpha = .82$. Content-area teachers received a 40-min training on how to use the DBR (Chafouleas et al., 2007), using clips from an online training module to provide practice and feedback.

Systematic Direct Observation (SDO). Trained graduate students used a validated protocol for SDOs with the same 7 to 10 students employing Momentary Time Sampling (MTS; Saudargas & Lentz, 1986). Here, we were interested in occurrences of respectful positive social interactions marked by the same behaviors recorded by teachers at the beginning of each 20-s interval (Saudargas & Lentz, 1986). Interrater reliability was set at .70.

Content-Area Reading Performance

Teacher rating of content-area literacy skills: Adapted from existing performance rating scales (DuPaul, Rapport, & Perriello, 1991), this measure assesses student literacy skills with a 5-point scale. The first two items used focus on students' written content-area work and require teachers to estimate the percentage of a student's accurate and completed written work. Two additional items are included to measure a student's reading and speaking ability within the content area with responses ranging from "never" to "very often" or "poor" to "excellent." When used in previous studies, not specific to the disciplines, this instrument was positively correlated with standardized performance measures, was more sensitive to classroom behaviors (Shapiro & Kratochwill, 1988), and demonstrated acceptable reliability in the present study ($r = .86$).

Procedures and Evaluation of the Factor Structure

Preceding the first administration of the DRMM, demographic information on student characteristics was collected from schools. The habitual measures (MRQ and MTI) were collected at baseline, along with teacher ratings of students' content-area literacy skills. The following week, students were administered the DRMM in their content-area class over the course of a 2-week period for three observation sessions. Students filled out the DRMM at the conclusion of each of the three observed classes while teachers completed the DBR. Across the three observation occasions, trained researchers conducted 15-min classroom observations focused on the same literacy event as teachers and students. Students were accustomed to having research assistants

observing their classrooms as a result of previous research partnerships that year. DRMM administration was conducted on days when the class period involved "text-based activities" defined by the CCSS as any instruction that required students to have a text open (National Governors Association Center for Best Practices and Council of Chief State School Officers, 2010).

Data Analytic Plan

The first research question regarding the factor structure of the DRMM was addressed using exploratory factor analysis (EFA) to determine how many factors emerged from the data. The use of this exploratory approach reflects specific calls in the literature for research to explore constructs used in the MRQ and related assessments using exploratory analyses to determine potential alternative constructs at work (Watkins & Coffey, 2004). Furthermore, this approach permits an exploration of measure integrity and supports future theory refinement (Henson & Roberts, 2006). This study represents a critical step toward capturing situated motivations and, consequently, a more exploratory approach was warranted. Indeed, a previous study that imposed a factor structure for a habitual measure on an adapted situated measure failed to demonstrate convergent validity (S. R. Neugebauer, 2016).

Research indicates that when using repeated measures, subsequent administrations can be influenced by the first, with respondents, in some cases, providing more moderate responses as a function of having already expressed their feelings in a previous administration (R. Neugebauer et al., 1992). Thus, the first DRMM administration was used for the EFAs. For the second research question, a generalizability theory approach was used to better assess the reliability of the DRMM, a daily measure intended to capture dynamic processes (Bolger & Zuckerman, 1995). Generalizability theory is ideal for examining the reliability of the multiple daily DRMM administrations because it determines the reliability of an instrument that assesses daily systematic change over time (Cranford et al., 2006). This investigation explores the reliability of the 3 days of the DRMM and computes an average day-specific alpha coefficient and a coefficient of the systematic change over the 3 days.

EFAs along with descriptive analyses examining issues of convergent and divergent validity were performed using Predictive Analytics SoftWare (PASW) Statistics 19 (SPSS, 2009) with principal axis factoring procedures used for the EFA and excluding missing data using listwise deletion. Listwise deletion was selected as the current method for handling missing data, as it is more bias-free compared with other techniques included in SPSS, such as pairwise deletion and mean replacements (Jones, 1996). Initial explorations of the item-level data descriptive statistics of skewness and kurtosis indicated that all items were normally distributed.

For RQ3 and RQ4, Pearson's r correlations were estimated among the DRMM, MRQ, MTI, and different rater reports of social interactions (i.e., observer SDOs and teacher DBRs) during literacy events. Correlations in the predicted direction are a necessary test of the hypothesized theoretical network (Pett, Lackey, & Sullivan, 2003). For RQ5, exploring the utility of this measure for explaining variance in students' content-area reading performance, we fit several multilevel models (Singer & Willett, 2003), nesting students within classrooms to account for common unobserved experiences shared by students in classrooms. We selected this two-level model (students nested in classrooms) over a three-level model (students nested in classrooms in schools) because initial analyses indicated that less than 5% of the variance in the outcome was attributable to between school variability. Thus, a two-level model was adopted in the interest of parsimony (Singer & Willett, 2003). Data analysis was conducted using SAS (SAS Institute, 1997), and the SAS PROC MIXED statement was employed. We included in the two-level model students' demographic characteristics, specifically sex, as females commonly report higher reading motivation (see Durik, Vida, & Eccles, 2006), as well as all student motivation measures, to determine whether above and beyond the existing habitual measures, the DRMM explained additional variance in teacher-rated content-area literacy performance. The random effects were composed of a composite residual, including a student-level residual and a classroom-level residual.

Results

EFA

Before beginning factor extraction, several indicators were explored to ensure that the data were appropriate for this method of investigation. An examination of the correlation matrix revealed no signs of multicollinearity (e.g., inter-item correlations above .80). Items with low communalities were deleted (i.e., $r \leq .30$) to prevent a low degree of shared variance between items and, consequently, a large number of meaningless factors derived in the EFA (Pett et al., 2003). Thus, Item 6 of the original 18 items was removed from the questionnaire. Examination of the anti-image correlation matrix revealed that the Measure of Sampling Adequacy (MSA) for all items was sufficient (>.60) for conducting a factor analysis (Pett et al., 2003). After Item 6 was removed, the Kaiser–Meyer–Olkin MSA was .92, and Bartlett's Test of Sphericity was significant, $\chi^2 = 1{,}040.96$, $p < .0001$, suggesting that the sample size was sufficient relative to the number of items, and the correlation matrix was not an identity matrix.

The number of factors to extract was evaluated based on the scree plot, parallel analysis, and researcher judgment as well as the interpretability of the extracted factors (Henson & Roberts, 2006). Two factors were ultimately extracted when principal axis factoring with an oblique rotation was performed on the 17 items. An oblique method of rotation was selected as the most appropriate method for factor rotation as it was assumed that emergent factors would be somewhat correlated with each other based on previous literature (Fabrigar, Wegener, MacCallum, & Strahan, 1999). A direct oblimin rotation resulted in the best simple structure for the data; the two factors accounted for a combined 98.6% of the common variance in the items.

The range of final communalities was found to be between .27 and .70. The general practice in the instrument design literature is to have communalities above .50; 71% of the items demonstrated communalities above the .50 level. The only items for which the communality was low enough to warrant deletion were Items 8, 10, and 14 (Fabrigar et al., 1999). Next, items with pattern coefficients below .45 on their primary factor were deleted from the final scale (Items 16, 7, 3); these coefficients represent the effect of a latent factor on a specific item after accounting for any other factors.

Subsequently, the simple correlations between each item and the factors were examined by exploring the factor structure matrix. Several items were removed due to comparable loadings on both Factor 1 and Factor 2; Items 1, 9, and 11 were deleted. Most of the items demonstrated weak to moderate correlations with the secondary factors. The pattern and structure coefficients of the retained items are presented in Table 1. Results of these analyses indicate that there was discriminant validity across items and factors, and that the non-orthogonal type factor rotation method chosen was appropriate. Based on retained items, these two constructs were labeled *Content-Area Curiosity* and *Content-Area Involvement*. Items in Factor 1 (Items 12, 13, 15, 17, and 18) assessed whether students' reading stimulated interest and current excitement about the reading task and/or topic, and thus was named *Content-Area Curiosity*. The majority of the items contained in this subscale are those that were hypothesized to represent curiosity/interest in reading. However, Items 13 and 17 also emerged as items that comprise the *Content-Area Curiosity* construct, and were crafted originally to reflect reading involvement. The inclusion of Items 12, 15, and 18 (curiosity-based items), as well as 12 and 17 (involvement-based items), when considered together, assess a student's current interest in a literacy event, finding it "gripping and exciting," and also maintaining interest ("I enjoyed reading and didn't want to stop reading"). Thus, the construct that emerged is closely aligned with conceptions of students' interest (Renninger, Hidi, & Krapp, 1992), and particular to the present context—their interest as a function of the text, task, and content area. The second factor composed of three items (2, 4, and 5) assessed students' desire to understand what they were reading in the content area, and thus was named *Content-Area Involvement*. This construct was composed of an item based on the construct of involvement (Item 4) and two items that were based on curiosity items (Items 2 and 5); however, when viewed together, this construct assesses the desire to immerse oneself in the text for the purpose of better understanding, that is, applying one's "full attention," and wanting to be knowledgeable and have an understanding of the concepts in the text.

Reliability Estimates for the Dynamic Reading Motivation Measure

The variances associated with each of the distinguishable components (person, day, item, Person × Day, Day × Item, Item × Person) were estimated from the data, using the VARCOMP procedure of SAS (SAS Institute, 1997). These variance components were used to compute generalizability coefficients for (a) the expected between-person reliability estimates for one fixed day, a kind of average day-specific alpha coefficient across the questionnaire days, and (b) the systematic change of persons over days, an estimate of the precision of the measurement of systematic change. For the subscales of *Content-Area Curiosity* and *Content-Area Involvement*, the DRMM's ability to distinguish persons on a single fixed day was good across both subscales ($\alpha = .83$ and $\alpha = .77$, respectively). Furthermore, systematic changes in *Content-Area Curiosity* and *Content-Area Involvement* across days was also reliably measured, ($\alpha = .96$ and $\alpha = .90$, respectively); these subscales reliably measure differences in change over days.

Mean Scores and Descriptive Statistics

Before exploring the associations among the different habitual and situated motivation measures, descriptive statistics were examined for each of the measures by day and are displayed in Table 2. On average, student scores across days approximated a 3 on the *Content-Area Involvement* factor (see Table 2), with student scores increasing slightly over the course of the three administrations. On average for the *Content-Area Curiosity* factor, students scored a 2.4 across days with incremental increases over the course of the three waves of data. Thus, on average, the prototypical student would report on the *Content-Area Involvement* factor "mostly true for me" for the item "In [content area] class today I wanted to understand the concepts I was reading about" and would report for the *Content-Area Curiosity* factor "a little bit true for me" for the item "In [content

Table 1. Pattern and Structure Coefficients for the DRMM.

Item number	DRMM involvement Item	Factor 2 P	Factor 2 S	Factor 1 P	Factor 1 S
Q2	I wanted to be knowledgeable about the topic I was reading about	**.726**	**.682**	–.016	.423
Q4	My full attention was on the ideas/information in the text	**.826**	**.810**	–.110	.401
Q5	I wanted to understand the concepts I was reading about	**.573**	**.656**	.111	.472
Item Number	DRMM Curiosity Item	Factor 2 P	Factor 2 S	Factor 1 P	Factor 1 S
Q12	When we discussed a text in class, I wanted to read more about it	–.087	.342	**.749**	**.704**
Q13	I enjoyed reading and did not want to stop reading	–.189	.380	**.933**	**.803**
Q15	I read because I was curious to learn more about the topic	.200	.567	**.569**	**.701**
Q17	I found what I was reading gripping and exciting	.018	.520	**.836**	**.841**
Q18	I wanted to learn more about the topic I was reading about	.103	.570	**.764**	**.847**

Note. Significant, retained pattern and structure coefficients are noted in boldface type. DRMM = Dynamic Reading Motivation Measure; P = pattern; S = structure.

Table 2. Measure Means Across Motivation, Engagement, and Performance Instruments Across Days (n = 140).

Measures	Observation 1 *M*	Observation 1 *SD*	Observation 2 *M*	Observation 2 *SD*	Observation 3 *M*	Observation 3 *SD*
Daily measures						
DRMM involvement	2.77	0.74	2.82	0.74	2.88	0.78
DRMM curiosity	2.33	0.85	2.32	0.80	2.56	0.86
Social interactions (teacher)	5.91	4.03	6.82	3.95	6.93	3.86
Social interactions (observer)	99.83	1.01	99.94	0.59	98.95	10.26
Stable measures						
Teacher-rated content-area reading performance	3.54	0.91				
Subject interest	2.53	0.76				
MRQ curiosity	2.77	0.56				
MRQ involvement	2.77	0.64				

Note. DRMM = Dynamic Reading Motivation Measure; MRQ = Motivations for Reading Questionnaire.

area] class today when we discussed a text in class, I wanted to read more about it." On the global MRQ, students on average scored a 2.77 for both subscales. Thus, a prototypical student would report "a little like me" for items such as "I read to learn new information about topics that interest me" for the Curiosity subscale and "I make pictures in my mind when I read" for the Involvement subscale. Teachers rated students on average as exhibiting a 6.55 (with scores ranging from 1 to 10) on the respectful behavior measure. In other words, teachers rated students as positively interacting with others 65% of the time dedicated to the reading activity. Observers rated students as positively interacting with others 99% of the time dedicated to the reading activity. Table 3 displays information about the text and reading activity for each classroom on each observation day. On average, teachers rated students' content-area reading as a 3.54, a score of approximately "above average." On average, students rated their content-area interest as a 2.53 (with scores ranging from 1 to 4). Therefore, the average prototypical student would report "mostly true for me" for the item "I enjoy [content area] work." Students' subject area interest varied by content area with students in math exhibiting the highest subject area interest (2.82), followed by ELA (2.51), science (2.15), and finally social studies (2.09) (see Table 4).

Distinctions Among Motivation Constructs: Convergent and Divergent Validity

The average correlations among the situated motivation factors (*Content-Area Curiosity and Content-Area Involvement*) and the more general reading motivation

Table 3. Texts and Activities by Class and Content Area.

Subject area	Day 1	Day 2	Day 3
ELA			
Teacher 1	Fiction novel	Fiction novel	Fiction novel
	Teacher led	Teacher led	Teacher led
Teacher 2	Fiction novel	Fiction novel	Fiction novel
	Partner reading, teacher led, small group	Student alone reading, partner reading	Partner reading
Teacher 3	Fiction novel	Fiction novel	Fiction novel
	Teacher led	Small group, teacher led	Teacher led
Teacher 4	Fiction novel	Theatrical fiction script	Theatrical fiction script
	Small group	Small group, individual student reading	Small group
Teacher 5	Fiction novel	Fiction novel	Fiction novel
	Small group, teacher led	Small group, teacher led	Individual student reading, teacher led
Teacher 6	Directions for upcoming assignment	Fiction novel	Fiction novel
	Teacher led	Individual reading, teacher led	teacher led
Teacher 7	Directions for upcoming assignment	Fiction handout	Fiction handout
	Teacher led	Teacher led	Teacher led
Teacher 8	Expository article	Teacher-created expository text	Directions about five-paragraph essays Individual student reading
	Individual student reading	Teacher led	
Teacher 9	Expository article	Survey data	Teacher-created expository text
	Small group, individual student reading	Small group, teacher led	Small group, teacher led
Math			
Teacher 10	Word problem worksheet	Word problem worksheet textbook	Word problem worksheet review textbook
	Individual student reading, teacher led	Small group, individual student reading, teacher led	Teacher led
Teacher 11	Word problem worksheet textbook	Teacher-created word problem quiz	Teacher-created word problems
	Individual student reading, teacher led	Individual student reading, teacher led	Individual student reading, teacher led
Teacher 12	Teacher-created word problems	Word problem worksheet	Word problem worksheet textbook
	Individual student reading	Teacher led	Teacher led
Science			
Teacher 13	Expository article	Expository article	Directions and procedures for laboratory experiment textbook
	Individual reading alone, teacher led	Individual student reading alone, teacher led	Partner reading, teacher led, small group
Teacher 14	Expository article	Expository article	Directions and procedures for laboratory experiment textbook
	Partner reading, teacher led	Individual student reading, partner reading, teacher led	Individual student reading, partner reading, teacher led
Social studies			
Teacher 15	Expository article	Teacher-created worksheet	Expository essay
	Teacher led, individual student reading	Individual student reading, teacher led	Teacher led

Note. ELA = English language arts.

subscales were moderate, with habitual MRQ involvement exhibiting an average correlation of .32 with *Content-Area Involvement* across the 3 days and an average of .30 with *Content-Area Curiosity* (see Table 5). The habitual MRQ Curiosity subscale exhibited on average a correlation of .34 with *Content-Area Involvement* and .33 with *Content-Area Curiosity*. The positive and moderate correlation among measures is consistent with previous research, that is, r = .45 (Guthrie et al., 2007), on correlations between situated and habitual measures of motivation constructs.

The MTI exhibited moderate correlations with the situated reading motivation subscales. The average correlation

Table 4. Mean Subject Area Interest Across Content Areas.

	Total	English	Math	Social studies	Science
Subject area	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)
Content-area subject interest	2.53 (.76)	2.51 (.73)	2.82 (.80)	2.09 (.37)	2.15 (.79)

Table 5. Correlations Across Measures and Raters.

Variable	1	2	3	4	5	6	7	8
1. Content-area involvement	1.00							
2. Content-area curiosity	.64**	1.00						
3. MRQ curiosity	.34**	.33**	1.00					
4. MRQ involvement	.32**	.30**	.45**	1.00				
5. MTI	.47**	.48**	.32**	.34**	1.00			
6. Teacher prosocial interactions	.22*	.19~	.10	.14	−.03	1.00		
7. Observer prosocial interactions	.20~	.12	.11	.14	.15	.32**	1.00	
8. Small group	.17~	.12~	.03	.03	.05	.40**	.26*	1.00

Note. MRQ = Motivations for Reading Questionnaire; MTI = Measure of Topic Interest.
*$p < .05$. **$p < .01$. ***$p < .0001$.

across days between the MTI and the *Content-Area Involvement* subscale was .47. The average correlation between the MTI and the *Content-Area Curiosity* subscale was .48 across the DRMM administrations. Similar to the global motivation constructs, the positive and significant correlations among these measures provide convergent validity for the motivational nature of the target constructs, while also supporting their potential uniqueness.

Social Aspects of the Reading Activity Across Raters

Table 5 also displays the correlations among rater reports. Teacher reports of positive social interactions was on average positively and significantly correlated with *Content-Area Involvement* ($r = .22$, $p < .05$) and positively correlated and tending toward significance with *Content-Area Curiosity* subscale ($r = .19$, $p < .06$). Observer ratings were positively correlated and tended toward significance with students' DRMM ratings on the *Content-Area Involvement* subscale, ($r = .20$) but were small and not significant for the *Content-Area Curiosity* subscale ($r = .12$). The correlation between teacher and observer reports was positively significantly associated, with an average correlation across days of $r = .32$. Table 5 also indicates that classrooms with more small group activities exhibited higher DRMM scores, with the frequency of small group activities positively correlated and tending toward significance for the *Content-Area Involvement* subscale ($r = .17$, $p > 08$) and the *Content-Area Curiosity* subscale ($r = .12$, $p < .10$).

Utility for Student Content-Area Literacy Performance

We estimated several multilevel models to explore the utility of the DRMM, beginning with our central control variable (male), and then adding our covariates (the MRQ and MTI). Finally, the DRMM subscales were added to the model. For the present analysis regarding the association between the DRMM and teacher-rated content-area reading performance, the DRMM scores across the 3 days were calculated as an average score to provide a more reliable estimate of students' content-area-specific motivations to read. For a priori hypothesis testing, statistical significance was set at $p < .05$. We tested potential interaction terms at each stepwise addition, but they were not found to be significant and thus, were not included in the final model.

In Table 6, the final model is presented. The final multilevel model included our control predictor, male ($b = -.26$, $SE = .16$, *ns*), and all the relevant motivation measures both current and habitual (see Table 6). In the final model, the MRQ and DRMM subscales behaved similarly, that is, the *Content-Area Involvement* subscale was positively associated with content-area reading performance ($b = .35$, $SE = .16$, $p < .05$), as was the MRQ Involvement subscale ($b = .33$, $SE = .13$, $p < .05$). However, the *Content-Area Curiosity* subscale ($b = -.55$, $SE = .13$, $p < .001$) and the MRQ Curiosity subscale ($b = -.19$, $SE = .13$, *ns*) were negatively associated with content-area literacy performance. The MTI was positively and significantly correlated with content-area reading performance ($b = .38$, $SE = .13$, $p < .01$). These findings indicate that, when accounting for

Table 6. The Final Multilevel Model for Content-Area Specific Literacy Performance.

	Final model
Parameter	Coefficient (*SE*)
Fixed effects	
Intercept	2.77 (.46)***
Male	−.26 (.16)
Content-area involvement	.35 (.16)*
Content-area curiosity	−.55 (.13)**
MRQ involvement	.33 (.13)*
MRQ curiosity	−.19 (.13)
Subject area interest	.38 (.13)**
Random effects	
Intercept	.06 (.05)
Residual	.45 (.07)***
Goodness-of-fit	
−2LL	187.6

Note. MRQ = Motivations for Reading Questionnaire; LL = LogLikelihood. *$p < .05$. **$p < .01$. ***$p < .0001$.

students' more stable reading motivations, students' content-area-specific reading motivation, as measured by the DRMM subscales, still explained unique variance in content-area reading performance. The final model's goodness-of-fit statistic of 187.6 provided a parsimonious model.

Discussion

This study sought to design and explore a novel measure of daily reading motivation across content areas. Results support a two-factor model to capture students' motivation to read during content-area reading: *Content-Area Involvement* and *Content-Area Curiosity. Content-Area Involvement* refers to students' desire to fully understand what they are reading, particularly as it relates to the ideas, concepts, and topics in the text. *Content-Area Curiosity* refers to students' present excitement and persistent interest in a literacy event.

Factor Structure of the Dynamic Reading Motivation Measure

Intrinsic motivation in situated contexts. The factors that emerged were not only related to habitual constructs but also provided more targeted understandings of students' motivation to read in situ. Notably, in the *Content-Area Curiosity* construct, the intrinsic motivation items that emerged as a substantive factor, when administered daily, were similar to related items found in the interest literature, an area of motivation research closely related to intrinsic motivation (Renninger et al., 1992). The construct of interest has been operationalized to explore students' topic interest or—specifically as it relates to reading—text features that may increase student interest (e.g., themes, topics in a text). Interest questionnaires have commonly focused on the text as the unit of analysis (Flowerday, Schraw, & Stevens, 2004); however, this study demonstrates the relevance of this construct for a more interactive understanding of reading that represents a reaction to factors in the environment.

The second factor that emerged in the present study, *Content-Area Involvement*, assesses students' drive to integrate information from the text into their knowledge set. Unlike the construct of habitual involvement (see Note 3), which encompasses feelings of being absorbed in reading activities for enjoyment, the present construct more specifically assesses absorption for the purpose of knowledge construction (see Note 4). Given this more academically oriented involvement, future research should explore the potentially positive correlation between *Content-Area Involvement* and cognitive forms of reading engagement (such as reading strategies), as well as the potential predictive validity of this construct for adolescent reading outcomes. Notably, this construct seems particularly relevant for older students, as the goals of school reading have changed and reflect the challenges of reading in the disciplines for information (Shanahan & Shanahan, 2008).

In previous studies, habitual dimensions of reading curiosity and reading involvement have demonstrated considerable conceptual resemblance (Conradi, 2011; Murphy & Alexander, 2000; Schiefele et al., 2012; Watkins & Coffrey, 2004). Distinctions between these intrinsic motivation constructs emerged in the present study, but further investigation of their multidimensionality is warranted.

Potential Validity of the DRMM

Convergence across related measures. Results of the current investigation support the divergent and convergent validity of this measure with existing related measures. Students' DRMM scores were positively and significantly correlated with the most commonly used habitual reading motivation questionnaire, the MRQ. As was predicted, these constructs were related, but their weak-to-moderate correlations support the distinctiveness of these motivation constructs and the existing literature on correlations across motivation measures and subscales (e.g., Guthrie et al., 2007, $r = .57$). We also hypothesized that the DRMM subscales would be highly associated with students' subject area interest. It is reasonable that a student's interest in social studies would increase the likelihood that he or she would desire to understand the text he or she is reading (*Content-Area Involvement*) in social studies and that the

same student would be more likely to find himself or herself interested in that day's social studies reading activity (*Content-Area Curiosity*). Indeed, both subscales were positively correlated with the MTI.

Convergence across reporters. Findings from the current study indicate that teacher ratings of students' positive social interactions were positively correlated with student reported *Content-Area Involvement*. That is, students who reported having greater desire to understand the target text were rated by teachers as engaging in more frequent positive social interactions during the same target literacy event. These correlations were not particularly strong; however, previous studies also demonstrate a weak-to-moderate range of correlations when exploring teacher and student reports of motivational aspects of the classroom, for example, $r = .26$ (Guthrie et al., 2006).

To triangulate data around the three reading occasions, we also explored observer reports of students' positive social interactions during literacy events. Observer reports were weakly (*Content-Area Involvement*) or not significantly (*Content-Area Curiosity*) associated with student DRMM scores. Notably, across classrooms, observers rated the students as engaging in positive social interactions on average 99% of the reading activity, restricting the potential variability in observer ratings of students. Moreover, previous research has not found a significant correlation between observer reports and student reports of motivation related constructs (Guthrie et al., 2007). However, in the context of the present study with more situated measures we hypothesized that a statistically significant positive relationship between observer and student reports would be more likely. The continued lack of a correlation between these reporters raises questions about what might be missing in our understanding of the relationship between what is observed and students' perceived experiences. Future studies should look more comprehensively at observation protocols and student self-report measures with attention to different observer, student, and classroom characteristics that may affect this relationship.

Of note, as it relates to the potential utility of this measure for responsive instruction, is that while the vast majority of class time was spent on teacher-led activities (i.e., 80%), classrooms that reported more small group activities with texts had higher scores on both the *Content-Area Involvement subscale* ($r = .17$, $p < .05$) and the *Content-Area Curiosity* subscale ($r = .12$, $p = .10$). Studies show that social interaction around reading can increase students' curiosity and engagement with texts (Ng, Guthrie, Van Meter, McCann, & Alao, 1998). The positive association between small group activities and DRMM scores provides promising evidence that the DRMM might be used to determine whether small group interactive reading activities might be particularly useful for specific content-area reading experiences.

Utility for content-area literacy performance. Results from our multilevel modeling indicate that indeed the first construct of this novel measure, *Content-Area Involvement*, was positively associated with teacher ratings of students' content-area literacy performance, as was the MRQ involvement and the MTI. The positive relationship for the habitual measures and the *Content-Area Involvement* subscale of the daily measure is consistent with existing research on the relationship between motivation to read and reading performance (Baker & Wigfield, 1999; Unrau & Schlackmann, 2006; Wang & Guthrie, 2004). Unexpectedly, *Content-Area Curiosity*, the second construct assessed by the DRMM, as well as the MRQ Curiosity subscale, were negatively associated with teacher ratings of students' content-area performance. This finding was particularly surprising because reading motivation was assessed in a situated way and teachers' rated literacy skills in a more targeted manner. However, a cross-sectional study also demonstrated a negative association between the MRQ Curiosity subscale and reading comprehension (Schiefele & Schaffner, 2016). Notably, in the same study the negative relationship disappeared when curiosity was used as a predictor of longitudinal reading scores. It is possible that *Content-Area Curiosity*, similarly, might not contribute to short-term gains in performance, but might affect content-area reading performance in the long term. Two studies, one by Hidi and Harackiewicz (2000) and the other by Guthrie and his colleagues (2007), concluded that situated interest in reading (that is driven by personal interest) contributes to a global interest in reading over time, which increases reading performance in the long term. Still unknown and of importance is whether there is a potential cumulative benefit of *Content-Area Curiosity*, whereby content-area reading performance might also be improved in the long term.

Limitations

There are several limitations to this exploratory study that warrant mention. First, this study had a relatively small sample size. However, for instrument design purposes, the accepted practice is that there should be a minimum of five respondents for each item on a survey (Fabrigar et al., 1999). Based on this common practice, the 18 items of the DRMM would require a sample of 90 students. The present sample exceeds this minimum sample size.

The DRMM is a self-report measure and thus may be influenced by social desirability. In the present study, several efforts were made to reduce these effects: Students were informed that their answers would not be seen by their

teachers and were required to put their questionnaires in a sealed envelope, collected by research assistants. These practices were implemented to assure students that their responses would not be viewed by teachers and thus decrease their desire to report more positive motivations. Although self-report measures have limitations, they are also a useful tool for teachers for informing practice (Finn & Sladeczek, 2001).

Future Directions

Based on these limitations and the findings that emerged in this study, we propose several areas for future research. First, subsequent research should build upon and further test the DRMM by (a) exploring the factor structure with a larger sample, using both exploratory and confirmatory factor methods with a split sample design, to determine whether the present structure is replicated and whether, for example, a second order intrinsic reading motivation factor may provide a better fitting model and (b) investigating factor strengthening, given that the *Content-Area Involvement* subscale only includes three items. A second area for future work is an investigation of the validity and usability of this measure for more diverse samples that include a more evenly distributed population of males and females as well as more ethnically, culturally, socio-economically and linguistically diverse populations. Finally, further examination of the positive correlation in the present study between teacher performance ratings and student self-reports of motivation, using more proximal measures of student performance in the content areas, is needed. Specifically, one potential avenue for exploration is work that addresses the relationship between cumulative DRMM data collection and students' performance on Reading—MAZE assessments as well as standardized subject area tests (e.g., the ACT college readiness assessment). A second avenue for investigating the potential explanatory power of the DRMM would include an examination of the relationship between district-mandated content-area measures and cumulative scores on the DRMM.

Educational Implications

The DRMM allows teachers to continuously alter their instruction in response to students' experiences. Given research that shows teachers often have misimpressions of students' motivation (Bangert-Drowns & Pyke, 2002; Givvin, Stipek, Salmon, & MacGyvers, 2001), especially in the case of struggling readers, this instrument provides an opportunity for teachers to "hear" from all their students about what is and isn't supporting their motivation to engage in daily reading activities in the content areas. For example, a social studies teacher who finds that her class demonstrated low scores on the DRMM Curiosity subscale for individual reading of a primary source may want to alter instruction to stimulate more curiosity about the target text. Thus, she might choose a frontloading activity where the primary source is put at the center of a historical debate and students must read the primary source to weigh in on the debate. A second administration of this measure will allow this social studies teacher to know whether students' curiosity about the text has increased with this instructional change. This measure might be used at the level of the individual student; the same social studies teacher might find that one student scored high on the DRMM Curiosity subscale but low on the DRMM Involvement subscale when reading the same primary source, that is, the student was curious about the topic and reading activity but didn't feel a desire to master the material being read. Based on this information, the teacher might try specific instructional techniques that emphasize the value of the material such as meeting individually with the student to discuss the primary source themes relevant to the student's life or use a jigsaw activity in the following class where the student must read a primary source and serve as the text expert and share out to his or her small group. In daily practice, this instrument allows teachers to tweak lesson plans to be more effective in stimulating motivation to read and helps them identify aspects of the lesson that may be more or less successful, as opposed to the more common practice of just selecting easier texts (Buehl, 2011).

Beyond daily lesson plans, this instrument helps teachers pinpoint practices that when matched to specific kinds of discipline-specific texts are consistently motivating. The same social studies teacher might find that using the jigsaw technique does produce increases in student scores on the DRMM and thus she may choose to implement jigsaw activities in conjunction with primary sources regularly in her classroom. Thus, this instrument empowers teachers to tease out what does and doesn't work in their classroom to increase reading motivation, without having to sacrifice certain texts or objectives, allowing them to successfully meet the demands of the CCSS and district curricular standards and expectations.

For teachers to succeed in engaging students in reading complex content-area texts a means of determining under what conditions students are motivated to read such texts is necessary (Moje et al., 2000). The DRMM provides an opportunity for teachers to intervene with students who have particularly low scores in their content-area reading motivation and better understand how these scores may operate as a potential mediator of reading skill and content-area reading performance. The development and validation of the DRMM serves as a crucial first step in supporting work that explores the relation between content-area reading motivation and performance and also initiates a promising line of inquiry focused on the use of this measure for instructional modifications.

Appendix

Original Items From the DRMM

Tell Us More about You and Reading

How did your class participate in a reading activity today?
Check the box or boxes that best represent what you did:

Your teacher led the activity ☐

You worked with a partner ☐

You worked alone ☐

You worked in a small group ☐

What did you read? _____

In [subject area] class today I . . . . . .

		Not at all true for me	A little bit true for me	Mostly true for me	Completely true for me
1.	I liked thinking deeply about the materials I read	1	2	3	4
2.	I wanted to be knowledgeable about the topic I was reading about	1	2	3	4
3.	I enjoyed thinking about the concepts I read about	1	2	3	4
4.	My full attention was on the ideas/information in the text	1	2	3	4
5.	I wanted to understand the concepts I was reading about	1	2	3	4
6.	I read to get more information about a specific topic	1	2	3	4
7.	I felt interested to learn something new through reading	1	2	3	4
8.	I created pictures in my mind while I thought about the texts	1	2	3	4
9.	I was interested in the materials we were reading	1	2	3	4
10.	I liked making connections between things I read and my own ideas	1	2	3	4
11.	I read because I was interested to learn new information	1	2	3	4
12.	When we discussed a text in class, I wanted to read more about it	1	2	3	4
13.	I enjoyed reading and did not want to stop reading	1	2	3	4
14.	I felt like I connected with characters or ideas in the texts	1	2	3	4
15.	I read because I was curious to learn more about the topic	1	2	3	4
16.	I was really focused on what I was reading	1	2	3	4
17.	I found what I was reading gripping and exciting	1	2	3	4
18.	I wanted to learn more about the topic I was reading about	1	2	3	4

Author's Note

Opinions expressed herein do not necessarily reflect the position of the U.S. Department of Education or Loyola University Chicago, and such endorsements should not be inferred.

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Notes

1. Some motivation scholars use the term, *current motivation*, to capture what we are calling situated motivation (Schiefele, Schaffner, Möller, & Wigfield, 2012). Motivation researchers vary in how they label the constructs described here, even when capturing the same or related constructs. To aide in understanding, we have simplified the discussion of the myriad terms.
2. To simplify terms, the literature referenced here includes the related construct of situational interest (Hidi & Harackiewicz, 2000). In the motivation literature, there is disagreement over whether interest represents a unique construct from intrinsic motivation or whether it may be considered a form of intrinsic motivation (Murphy & Alexander, 2000; Schiefele, 1999). We subsume this literature base under the term "situated motivation" here.
3. Habitual reading involvement has been operationalized differently across studies. Interested readers should refer to work by Wigfield and Guthrie (1997) as well as Baker and Wigfield (1999) for definitions primarily focused on students' absorption in and enjoyment of reading fictional and informational texts as well as Schiefele and Schaffner (2016) for definitions addressing getting "lost in a story and experience imaginative actions" (p. 223). The Content-Area Involvement factor composed of situated items addressed involvement not as escape or entertainment (see items that did not emerge as part of either factor) but instead as absorption for the purpose of extracting information, that is, a desire to experience understanding.
4. This construct resembles knowledge goals, a motivation dimension captured in existing habitual measures for informational texts that addresses students' reading for the purpose of learning facts and concepts, as well as student satisfaction from gaining new information as opposed to simply being entertained (Klauda & Wigfield, 2016).

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