Student-Centered Analyses of Classroom Perceptions and their Prediction of Student Disengagement

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Abstract

The purpose of this project was to examine modifications to REACT—a student rating scale assessing the classroom environment—to better predict classroom aspects associated with student disengagement. Specifically, the studies examined psychometric properties of student rating items corresponding to unsupportive and unpleasant aspects of the classroom environment within the existing subscales on REACT, as well as items corresponding to perceptions of social interactions and teacher relational support. The studies then examined the extent to which new items and existing items on REACT associated with student reports of engagement and disengagement and student characteristics considered to place students at risk for disengagement. 1160 middle school students completed REACT, along with 36 new items and a measure of engagement and disengagement. Teachers reported data about student characteristics, including gender, Special Education and Section 504 status, achievement in class, social behavior, and class participation for 744 of these students. Study one examined psychometric properties of the new items, including several confirmatory factor analyses to assess the extent to which new items fit with REACT. Results indicated a majority of items constituted a new instrument—CAIRS—corresponding to social aspects of the classroom environment, in contrast to instructional aspects. Regression analyses indicated new items accounted for additional variance in student engagement and disengagement, after controlling for responses on REACT. In Study two, correlation and regression analyses indicated REACT scores exhibited few significant differences relative to different student characteristics. CAIRS scores did exhibit such differences, but effect sizes were small. Implications and future research are discussed.

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Chapter 1

Classroom Environment as a Means to Improve Student Outcomes

Student engagement in the classroom is predictive of improved academic effort and positive academic outcomes (Farrington et al., 2012; Hattie, 2008). Elements of the classroom environment, such as interpersonal relationships and teacher feedback on performance are associated with student engagement (Goodenow, 1993; Ryan & Shim, 2012). Such classroom environment elements are malleable and subject to change, and research shows that changes to different classroom elements can contribute to changing students' experiences, and consequently, their academic and motivational outcomes (Fraser & Fisher, 1986; Guthrie, Klauda, & Ho, 2013; National Research Council and the Institute of Medicine, 2004).

Rating scale data on how students perceive their classrooms appear to offer unique information about students' experiences of these classroom elements. (Brekelmans, Mainhard, den Brok, & Wubbels, 2011). Educators who use student rating data to inform classroom modifications require effective tools to assess relevant classroom elements that are sensitive to variation in student ratings and foster best practices (Fraser, 1998; Hattie, 2008). To capitalize on the nature of students' individual interactions with classrooms, tools should also yield data that allow educators to identify which classroom elements matter more and for whom (Dorman, 2002; Hunt, 1975).

The Importance and Utility of Student Perception Data

Data on how students perceive their classrooms—as captured by student rating measures—appear to offer unique information about classroom elements, as compared to

observer and teacher-rating methods, with several studies noting differences between teacher and student ratings of the same classroom elements (Brekelmans et al., 2011; Skinner, Kindermann, & Furrer, 2009). For example, a study of 694 high school students found that self-reports by teachers on their use of motivational strategies were not significantly associated with students' motivation or achievement; however, student *perceptions* of these strategies—as captured by rating scale responses—were significantly associated with both motivation and achievement (Bernaus & Gardner, 2008). Furthermore, study of 6,060 secondary classrooms found that when teachers self-reported use of control, warmth, and care toward students, teacher ratings were half a standard deviation higher than student ratings (Brekelmans et al., 2011). The researchers concluded that the results indicated teachers overestimated their implementation of positive relational strategies, relative to students' experiences of such strategies. As these results suggest, students' perspectives on the classroom environment appear to offer information on the classroom that is different from data reported by teachers. As such, student rating data, when effectively collected, may offer researchers and practitioners additional information on students' experiences in the classroom, apart from what data may be obtained from teachers.

Studies have demonstrated that student perception data also have potential as a tool to guide efforts to change classroom conditions (Fraser & Fisher, 1986; Nelson, 2014; Sinclair & Fraser, 2002). Fraser and Fisher (1986) recommended that teachers use student perception data in an action research approach to making classroom modifications. Since that publication, however, only a relatively small number of

studies—the majority of which included Fraser and Fisher as investigators—have examined uses of student perception data in classroom interventions, and several of these studies employed case study methodology at the classroom level, rather than for smaller groups of students within classrooms (Fraser & Fisher, 1986; Nelson, 2014; Sinclair & Fraser, 2002; Waldrip, Reene, Fisher, & Dorman, 2008). Research that examined student perception data also has emphasized the ease with which such data may be collected via rating scales and returned to the teacher for reflection and problem identification and analysis (Fraser & Fisher, 1986). Student perception data, then, may allow teachers to quickly capitalize on identified practices and interactions specific to a given classroom (Fraser & Fisher, 1986; Sinclair & Fraser, 2002).

Measuring Student Perceptions: REACT

In an effort to assess student perceptions of the classroom environment, Christ, Nelson, and Demers (2014) developed the *Responsive Environmental Assessment for Classroom Teaching* (REACT). The version of REACT used in prior research is presented in Appendix A. The instrument was designed to collect student ratings of different aspects of the classroom environment, with an emphasis on alterable teacher practices. The measure included 27 items grouped into five six order factors— Positive Reinforcement, Instructional Presentation, Goal Setting, Differentiated Instruction, Formative Feedback, and Instructional Enjoyment—with all five factors grouped within a second-order factor labeled the Classroom Teaching Environment (Nelson, Demers & Christ, 2014). Preliminary research with responses from middle school students provided evidence that student ratings effectively discriminated between teacher and classroom

practices and indicated convergence across students in different classes taught by the same teacher (Nelson, Demers, Karich, & Christ, 2012). Another study indicated that REACT scores predicted student engagement levels (Demers, 2013). Still, other research demonstrated that student ratings on REACT were sensitive to changes in student perceptions of the classroom over time (Nelson, 2014). In that study, REACT was used as a feature of professional development. Teachers were randomly assigned to either a REACT feedback or no feedback condition. Although some results were mixed, students of teachers in the feedback conditions showed significant improvements in their post-test REACT scores as compared to those in control conditions (Nelson, 2014).

Despite its strengths, research with REACT has suggested two areas that warrant further research and development. First, there is a need for new items that account for unsupportive or unpleasant classroom experiences, and for how students feel related to their teachers interpersonally. Adding such items might account for a broader range of students' classroom experiences and better predict their engagement and *dis*engagement in class. Second, there is a need to examine student ratings by demographic groups and risk factors. The theoretical frameworks on which the use of classroom rating data are based assert that rating scale responses from students provide data that allow for an understanding of person-environment fit at the individual and group level (Fraser & Fisher, 1986; Guthrie, Lutz Kaluda, & Ho, 2013; Skinner Zimmer-Gembeck, & Connell, 1998). Based on engagement and learning environments research, students identified as at-risk for disengagement based on administrative and teacher report data would be expected to report systematically poorer perceptions of the classrooms. The following

sections articulate the rationale for continued scale development in each of these two areas.

Unsupportive Classroom Experiences and Perceptions of Student-Teacher Relationships

Research into student engagement and disengagement indicated REACT effectively predicted student *engagement* but was a poor predictor of student *disengagement* or "disaffection" (Demers, 2013). The first version of REACT relied on student ratings of research-based supportive classroom experiences such as use of formative feedback and differentiation of instruction (Nelson, Demers, & Christ, 2014). Classrooms, however, may offer *un*supportive as well as supportive experiences (National Research Council and the Institute of Medicine, 2004; Skinner & Pitzer, 2012). Such experiences may serve as obstacles to student engagement, as well as actively promote disengagement (Wallace, Ye, & Chhuon, 2012). The exclusion of items that assess unsupportive aspects of the classroom environment is a limitation of the initial version of REACT. It is likely that students not only perceive the absence of effective practices, but also the presence of ineffective practices, such as teacher criticism or punitive consequences as a behavior management strategy. To the extent that researchers and practitioners are interested in both engagement *and* disengagement, we might improve REACT with additional items. Those items would help assess student perceptions of unpleasant or unsupportive experiences, and better represent the range of student perceptions of classroom environments.

In addition to unsupportive interactions with the classroom environment, student perceptions of relationship quality with teachers appear to be of particular importance to how students experience their classrooms (Goodenow, 1993; Hamre, Pianta, Mashburn, & Downer, 2007; Klem & Connell, 2004). Research with observational, teacher rating, and student rating methods all identified that the quality of students' relationships with teachers is associated with engagement and achievement outcomes (Goh & Fraser, 2000; Goodenow, 1993; National Institute of Child Health and Human Development & Early Child Care Research Network, 2002; Pianta, Steinberg, & Rollins, 1995; Skinner, Furrer, Marchand, & Kindermann, 2008). Initial studies with REACT did not include items that addressed perceptions of interpersonal relationships with teachers. Adding items that ask students to rate these relationships, then, may increase REACT's representation of the classroom environment elements that appear indicative of student experiences and outcomes. Following the addition of the two categories of items described, research must then establish the coherence of the factor structure and underlying theoretical model of the classroom environment.

Analysis of Student Perception Data Relative to Student Characteristics

Research has identified student characteristics associated with risk for disengagement from class and school, including classification in special education, below average academic achievement, behavior problems in school, and being male (Christenson & Thurlow, 2004; Rumberger & Lim, 2008). To explore the use of student rating scale responses to identify aspects of the classroom environment associated with disengagement for certain students, research needs to examine the extent to which

students identified as at-risk for disengagement through administrative and teacher report data demonstrate systematically different scores on self-report rating scales of the classroom.

Much of the theoretical work on student perception data emphasizes the nature of person-environment interactions (Dorman, 2002; Hunt, 1975) that are a function of both the student and the environment. Student perceptions are not a purely objective measure of the environment. Instead, they present a perception of the environment, hence the interaction of personal and environmental factors. Such an interaction would likely result in ratings that vary across students in the same classroom, based in part on differing student characteristics. Prior research has neglected individual variation in the student-class interaction, which remains a relevant and interesting phenomenon to examine. An improved understanding of ratings by individuals and subgroups within a class will inform ongoing development and use of REACT.

Purpose

The purpose of this dissertation project was to examine modifications to the REACT designed to increase the extent to which the instrument measures key classroom experiences associated with engagement and disengagement. The dissertation also examined the extent to which students identified as at risk for disengagement and class failure would report different perceptions of the classroom on this revised version of the REACT. In study one, the authors generated new items designed to address unsupportive and unpleasant classroom experiences, and perceptions of interpersonal relationships with

teachers, then tested the psychometric characteristics of the revised versions. The research questions addressed were:

1.1 To what extent does the measurement model of the original version of REACT replicate with a new sample? That model included six first-order factors of Positive Reinforcement, Instructional Presentation, Goal Setting, Differentiated Instruction, Formative Feedback, and Instructional Enjoyment grouped within the second-order factor of the Classroom Teaching Environment.

1.2 To what extent do items related to unpleasant and unsupportive experiences along with student perceptions of teacher concern and relational support fit within the original or alternate factor structures for REACT?

1.3 What is the most viable approach to measure and model a broader range of student experiences and perceptions, which include the prior aspects of REACT along with unpleasant and unsupportive experiences and student perceptions of teacher concern and relational support?

1.4 To what extent did the supplemental aspects of student experiences and perceptions measured through newly added items enhance predictions of student engagement and disengagement in class?

1.5 To what extent does the fully revised version of REACT (that emerges from 1.2 and 1.3) better predict student engagement and disengagement in class than the original version of the instrument?

Study two examined whether responses on REACT varied by the characteristics of individual student raters. The research question was:

2.1 To what extent do students respond differently to classroom environment items based on student factors including: gender, Special Education and Section 504 status, academic achievement, classroom behavior problems, and observed participation in class?

Chapter 2

Chapter 2 is a review of the literature on engagement and disengagement classrooms and the use of student ratings of classrooms to examine engagement and disengagement.

The Roles of Engagement and Disengagement in Student Outcomes

Research on student engagement has examined short-term and long-term outcomes associated with engagement, including attainment and school completion (Rumberger & Lim, 2008), effort and achievement in individual classes or subjects (Reeve, 2013), and effort and investment in discreet academic tasks (Guthrie, Klauda, & Ho, 2013). With several outcomes associated with student engagement, there has been considerable research interest in both understanding and effectively promoting student engagement (Reschly & Christenson, 2012). Some of this research has examined *dis*engagement—or "disaffection" by some—as a separate, though related construct to understand the means by which students resist and withdraw from school and learning (Skinner & Pitzer, 2012).

Studies of student survey data have estimated that 40-60% of secondary students in United States exhibit significant disengagement from school, operationalized as expressed disinterest in or devaluation of school (Steinberg, Brown, & Dornbusch, 1997). Students who exhibit chronic disengagement are at risk for negative outcomes, such as antisocial and high-risk behaviors along with eventual drop-out (Dishion, Véronneau, & Myers, 2010; Rumberger & Lim, 2008). In addition to these negative long-term outcomes, disengagement impedes students' social and academic success more broadly. When

students are disengaged, as determined by student response data in which they report devaluing academic work, they are more likely to experience conflict with teachers, display disruptive behavior, and devote little effort to learning and understanding academic content (Ryan & Shim, 2012; Skinner & Pitzer, 2012).

Models of disengagement and engagement indicate they are self-perpetuating processes, such that disengagement at one point in time increases the odds of disengagement at later points in time (Finn, 1989; Skinner & Pitzer, 2012). The more students experience disengagement, the harder it is to engage them with the academic and social expectations of education as they progress through school. Identifying disengagement and addressing it in its early stages may be important to prevent students from further withdrawal and to promote engagement before disengagement reaches a critical point.

Experiences in the classroom can contribute to disengagement or provide opportunities to overcome disengagement and re-engage disengaged learners. Research with highly disengaged students, including those who dropped out of school, implicates classroom-level variables as possible causes of their withdrawal (Iachini, Buettner, Anderson-Butcher, & Reno, 2013; Wallace et al., 2012). Research on classroom disengagement might provide valuable insights as to the most salient variables associated with the pathway of disengagement. Such insights might inform prevention and early intervention efforts to prevent or remediate disengagement and to promote engagement.

Defining Engagement and Disengagement

Research has frequently treated disengagement as the *absence* of engagement, rather than as its own construct (Reeve, 2013; Skinner & Pitzer, 2012). Students are more often characterized as "low" in engagement rather than disengaged. Models that do include disengagement typically define it in conjunction with engagement and present it as a process that operates in a similar fashion as engagement. More specifically, disengagement involves students *withdrawing* from learning, where engagement involves students *investing* in learning. In other words, students demonstrating engagement exhibit approach behaviors relative to instruction and academic work, while students demonstrating disengagement demonstrate avoidance behaviors. As with engagement, disengagement is defined as an ongoing, multi-dimensional phenomenon (Finn, 1989; Skinner & Pitzer, 2012). Engagement scholars present engagement and disengagement as characteristics of an individual's interactions with the learning environment, rather than within-student characteristics (Finn, 1989; Skinner & Pitzer, 2012). According to Skinner and Pitzer, disengagement—or "disaffection" in their review—includes

> The ways in which students withdraw from learning tasks, including physical withdrawal of effort, such as lack of exertion, passivity, merely going through the motions, or exhaustion as well as their mental counterparts, such as lack of concentration, apathy, inattention, or amotivation (p. 25).

Their definition stands as an appropriate counterpart to the definition of student engagement Christenson, Reschly, and Wylie (2012) offer in the same volume:

> Student engagement refers to the student's active participation in academic and co-curricular or school-related activities, and commitment to educational goals and learning (p. 816).

Taken together, these two definitions emphasize the idea that disengagement includes feelings, actions, and beliefs that undermine involvement and increase avoidance and withdrawal from class, school, and learning. Conversely, engagement includes feelings, actions, and beliefs that promote involvement and investment in those same contexts.

Research has further specified that student engagement results when the elements of the educational context appropriately meet the psychological needs of the individual student, a concordance often identified as *person-environment fit* (Eccles & Wang, 2012). In terms of disengagement, when the educational context offers few supports, and a student enters this context with personal competencies that are ill-suited to or discordant with the expectations of the context, there exists poor "fit," leading to disengagement (Skinner, Kindermann, Connell, & Wellborn, 2009). Some research suggests that poor fit between individual characteristics and contextual elements is especially problematic during the middle school years, when the school and classroom context are often poorly suited to early adolescents' increased desire for autonomy (Eccles et al., 1993).

Models of disengagement present it as a recursive process, in which early negative experiences contribute to internal psychological processes, such as poor expectations, feelings of frustration, lack of confidence, and poor academic skills, that increase the chances of continued negative experiences of schooling later on (Finn, 1989;

Skinner & Pitzer, 2012). As these negative states accumulate over time, students withdraw progressively further from classroom and school activities—a process which culminates in complete withdrawal from school, or dropping out.

Both models reflect a view of disengagement as both a state and a process. At one point in time, disengagement includes the student's affective, behavioral, and cognitive *states* in a given context. Taken together, these affective, behavioral and cognitive states interact with the context. A recursive *process* of that interaction over time might function to reduce or increase disengagement. The student interacts with the learning environment to increase or reduce the future state of withdrawal, which might terminate with dropout versus graduation from school.

The view of disengagement as both a state and a larger process is consistent with definitions of *engagement* provided in recent reviews of engagement studies (Christenson, Reschly, & Wylie, 2012, Lawson & Lawson, 2013). The view is also reflected in studies that used different measures to capture disengagement. For example, a longitudinal study of affective and behavioral disengagement over one year for 805 students in grades 4 through 7 found that students' affective and behavioral disengagement in the classroom was fairly stable over the course of the school year, with spring scores strongly associated with fall scores (r = .58 and .58, respectively; Skinner et al., 2008). In addition, logistic regression analyses with data from a sample of 790 students followed from first grade through the end of high school found that student absences in first grade significantly predicted later dropout with an odds ratio of 1.04 (Alexander, Entwisle, & Horsey, 1997). The authors indicated that each additional day absent in first grade was associated with a

5% increase in the risk of dropping out later on (Alexander et al., 1997). These results highlight how a state of behavioral disengagement in first grade was implicated in a larger process of withdrawal from school in late adolescence.

Recent intervention studies aimed at improving students' school and classroom experiences have emphasized that comprehensive efforts to promote engagement need to actively assess and respond to disengagement (Guthrie, Klauda, & Ho, 2013; Reeve, 2013). For example, in a quasi-experimental study of an intervention for seventh grade students that targeted states of cognitive disengagement and engagement, as well as reading skills, Guthrie et al. (2013) found that the intervention condition related to increased reading comprehension by decreasing students' perceptions of reading as too difficult (b = -.09), was the largest of four effects on comprehension. In a randomized experiment with 385 students in grades seven through nine, Cohen, et al. (2009) presented two-year longitudinal effects of a brief, 30-minute intervention intended to reduce stereotype-threat. Students in the treatment condition wrote about their values for education four times a year. Over two years, African American students in the treatment condition demonstrated effects equivalent to an average increase of .24 grade points (out of 4.0), with the greatest gains (0.41 grade points) occurring among low-achieving African Americans. Disengagement, then, is a process that competes with engagement, and students who are disengaged appear to benefit from focused efforts to overcome their disengagement and re-engage with education.

Subtypes of Disengagement and Engagement and Their Component States

Research into student disengagement and engagement has typically addressed observable behaviors and internal affective and cognitive states, so that the prevailing models describe engagement as multidimensional with three subtypes: affective engagement, behavioral engagement, and cognitive engagement (Christenson et al., 2012; Fredricks, Blumenfeld, & Paris, 2004; Jimerson, Campos, & Greif, 2003). These models emphasize that internal student characteristics are key components of engagement (Appleton, Christenson, & Furlong, 2008). The Self-Systems Model of Engagement versus Disaffection that includes student *dis*engagement also emphasizes the three subtypes of affective, behavioral, and cognitive disengagement (Skinner & Pitzer, 2012). The definitions of each disengagement subtype that follow also draw on models of engagement to identify different components, since more has been written about the subtypes of engagement. Models of disengagement also typically present it in relation to engagement (Finn, 1989; Skinner & Pitzer, 2012).

Affective disengagement. Affective—or "emotional"—disengagement and engagement include the various emotional states students experience in response to contextual factors. This subtype of disengagement includes negative emotional responses to the learning environment, particularly toward educational tasks and interpersonal interactions. Such emotional responses can include boredom, anxiety, frustration, anger, and alienation. Alienation provides an important example of how disengagement is distinct from engagement. Engagement research has identified feelings of belonging and identification with school as key components of student engagement. Students who feel

welcome in the learning environment and connected the other individuals therein are expected to invest more in education (Voelkl, 1995). Students may experience greater or lesser feelings of *belonging*; however, *alienation* is the experience of feeling "other" or "stigmatized," which suggests a different category of emotional experience than "not" belonging (Mau, 1992). In this way, alienation is a competing emotional experience that is likely to avoidance behaviors relative to education. As students feel increasingly alienated from the learning environment and disconnected from the individuals within the environment, they are more likely to withdraw from education (Skinner & Pitzer, 2012).

Another aspect of students' affective disengagement and engagement is the nature of their interactions with teachers. Models of disengagement and engagement emphasize that the quality of teacher-student interactions are central to students' disengagement or engagement (Appleton, Christenson, Kim, & Reschly, 2006; Skinner & Pitzer, 2012). For example, in a longitudinal study of 179 children, Hamre and Pianta (2001) found that observer ratings of negative student-teacher interactions in kindergarten predicted negative behavioral and academic outcomes for students through the end of middle school, though with a modest effect size ($\Delta R^2 = .03$). In addition to emphasizing the role of student emotions in withdrawal from learning, this result also reflects how disengaged states at individual time points may contribute to a larger process of disengagement over time.

Behavioral disengagement. Behavioral disengagement and engagement include students' observable actions in the learning environment and related contexts (Lawson & Lawson, 2013). Aspects of behavioral engagement studied have included attending

school and class, participating actively in class, completing class assignments and homework, adhering to school and classroom rules, and participating in extracurricular activities. Definitions of *dis*engagement identify the *absence* of some of these positive aspects of engagement, such as "giving up" versus participating in class. These aspects, such as procrastination, giving up, and lack of preparation, involve withdrawal from, or avoidance of instruction and academic work (National Research Council and the Institute of Medicine, 2004; Skinner & Pitzer, 2012). Other aspects of behavioral disengagement reflect student behaviors that more actively work against engagement. For example, while lack of participation in class may indicate a certain level of disengagement, purposefully skipping class constitutes an active attempt on the student's part to withdraw from the activities of that class (National Research Council and the Institute of Medicine, 2004). Research on behavior in the classroom makes a similar distinction between passive disengagement, where students quietly attend to a stimulus other than the teacher, and disruptive behavior, in which the student actively disturbs the progression of the lesson (McGraw & Rubinstein-Ávila, 2009). Thus, behavioral disengagement may include a range of activity from the quiet withdrawal of effort or attention, to the active disruption of the lesson, to the students' active, physical withdrawal from the learning environment.

Cognitive disengagement. Cognitive disengagement and engagement include students' values and expectations regarding education as well as the mental effort they direct toward academic work (Fredericks et al., 2004). Definitions of cognitive *engagement* use terms like "investment in learning" to describe how engaged students

pursue challenges and persist in the face of setbacks (Fredericks et al., 2004). Researchers consider students' expressed values for education, and how students see education related to long-term personal goals as components of cognitive engagement (Appleton et al., 2006). Engagement research has also explored students' mental activity and effort in relation to schoolwork, such as their use of cognitive strategies, like mnemonic techniques or monitoring for comprehension, as elements of cognitive engagement (Fredericks et al., 2004; Jimerson et al., 2003).

In terms of *disengagement*, approaches to academic work that are characterized by "shallow" strategy use, and that emphasize completing work as quickly as possible with little regard for quality, are viewed as aspects of cognitive disengagement (Fredericks et al., 2004; Skinner & Pitzer, 2012). While empirical studies of disengagement have mostly focused on affective and behavioral subtypes (e.g. Skinner & Belmont, 1993), Skinner & Pitzer's (2012) theoretical model of cognitive disengagement cites studies that examined negative motivational states such as cynical attitudes toward school, or devaluing of schoolwork referred to as "amotivation" (Salmela-Aro, Kiuru, Leskinen, & Nurmi, 2009; Skinner & Pitzer, 2012; Vallerand et al., 1993).

In addition to ineffective use of learning strategies and self-regulation, several researchers have examined students' attitudes and beliefs as aspects of cognitive disaffection. Research into stereotype threat has identified how the implicit negative expectations Minority students hold regarding academics can undermine their academic performance (Nguyen & Ryan, 2008; Steele & Aronson, 1995). For example, a meta-

analysis of 116 studies examining stereotype threat found an overall effect size (*ds* = |.43|) for stereotype threat reducing the test performance of Minority students.

Motivation research more broadly has identified other attitudes and beliefs that undermine student performance, regardless of race. Students who hold a belief about intelligence as fixed and unchanging, rather than malleable and susceptible to change through effort, are at risk for lower performance (Dweck, 2006). Similarly, students who see themselves as unskilled in a particular subject area are more likely to exhibit poorer performance, even after controlling for academic proficiency (Eccles & Wigfield, 2002). For example, a study of 250 students in 7th through 9th grade reported structural equation modeling (SEM) results indicating that the extent to which students believed they would be successful in math significantly predicted their grades in math (γ = .50), even more strongly than their math grades from the previous school year (γ = .45; Meece, Wigfield, & Eccles, 1990). Goal theory research has examined how students' rationale for completing schoolwork is associated with their achievement and motivation. For instance, holding performance goals about schoolwork, such as completing an assignment to avoid getting in trouble, rather than to develop new skills or knowledge, is associated with lower motivation and achievement (Covington, 2000).

Student Perceptions Related to Engagement and Disengagement

Differences in how students perceive the classroom environment seem to play a role in disengagement. In a study of 805 fourth through seventh graders, Skinner et al. (2008) tested associations between disengagement, engagement, and teacher and student reports of supportive teacher behaviors, including involvement, provision of structure,

and support for student autonomy. Regression results using a composite of the three domains of teacher support revealed that teachers' reports of support for individual students were not significantly related to changes in students' behavioral and affective disengagement from fall to spring. Students' ratings of teacher support, however, were associated with changes in both behavioral ($\beta = -.12$) and emotional ($\beta = -.07$) disengagement, though both of these effect sizes were small. These results suggest that students' perceptions of teacher behaviors were more strongly related to their disengagement in class than teachers' reports. Taking such results into consideration, additional research is needed to further examine the magnitude of the relationships between student ratings of classroom variables and the subtypes of disengagement.

A critical aspect of this research is that disengagement and engagement involve internal psychological states and processes, in addition to observable behaviors. Consequently, important aspects of the state and process of disengagement are inaccessible to observers, including teachers. In fact, student self-ratings of affective and cognitive engagement frequently differ from teacher ratings (Skinner, Kindermann, & Furrer, 2009). For example, Lee and Reeve (2012) analyzed ratings of engagement among students in 10^{th} to 12^{th} grade ($N = 312$) and their teachers ($N = 8$). Students' ratings of their own affective engagement did not predict teacher ratings of affective engagement; rather, students' prior achievement was more strongly related to teacher ratings of engagement (Lee & Reeve, 2012). According to the authors, the results suggested that teachers based their ratings of students' engagement more on prior achievement than on students' current states. The findings illustrate that teachers, and

perhaps others, make errors in their assessments of student engagement and disengagement. Such errors might occur because much of the states and processes associated with disengagement and engagement are internalized (Appleton et al., 2008; Lee & Reeve, 2012; Skinner et al., 2009). One implication is that educators need information from individual student perspectives to accurately assess important aspects of engagement and disengagement, which include affective and cognitive components.

A rich body of research exists on the use of student-report measures to assess classroom environment quality (Fraser, 2012; Gettinger, Schienebeck, Seigel, & Vollmer, 2011). Despite a wide range of such measures, few of these tools include dimensions assessing specific types of negative classroom experiences. For instance, a study involving 347 students in grades 6 through 8 found that a classroom environment tool asking students to rate the relative frequency of positive classroom experiences predicted behavioral ($\beta = .30$) and emotional engagement ($\beta = .49$) but was a poor predictor of disengagement (Demers, 2013).

Where such tools do include items asking about negative experiences, these items are typically used to check measurement reliability and are reverse coded to indicate the relative presence of positive experiences (e.g. Dorman, 2008). Two exceptions are the "Conflict" and "Friction" scales from the Learning Environment Inventory (LEI) and the My Class Inventory (MCI; Fraser, 1982). These scales, however, only address negative interactions with *peers* in the classroom, and do not address other aspects of the classroom that may be more susceptible to teacher actions, such as perceptions of teacher disrespect toward the student. Tools assessing students' negative experiences of

classroom elements that are amenable to teacher action may help inform teacher efforts to reduce disengagement in the classroom.

Classroom Elements Associated with Engagement and Disengagement

Researchers have identified specific classroom characteristics that have shown associations with disengagement. In some cases, research has made causal claims about specific classroom experiences or characteristics and their effect on disengagement. These classroom elements include student-teacher interactions, behavior management and responses to student behavior, and instructional methods and academic task characteristics. The following three sections describe each of these elements in greater detail.

Student-teacher interactions. A large volume of retrospective studies explored disengagement through interviews with students identified as "disengaged" through teacher report or administrative data, such as placement in an alternative educational setting due to severe truancy. These studies consistently found poor relationship quality with teachers to be a key contributor to students' global disengagement from school (Cefai & Cooper, 2010; Hartas, 2011; Iachini et al., 2013; McGregor & Mills, 2012). Some interview studies implicated poor student-teacher relationship quality with specific aspects of behavioral disengagement, including misbehavior in class and decisions to stay home from school (Reid et al., 2010a, 2010b).

Studies that analyzed student interview data identified specific elements of student-teacher interactions that were associated with disengagement. These relational characteristics included teachers viewing students judgmentally and holding negative

expectations regarding their aspirations (Wallace, Ye, & Chhuon, 2012); conveying disrespect (Davidson, 1999; Duffy & Elwood, 2013); expressing doubt in students' abilities (Davidson, 1999); and showing a "just teach" attitude by focusing only on academic material with little expression of personal interest in students (Davidson, 1999; Wallace et al. 2012). A descriptive study using teacher report measures found that teacher-rated relationship quality showed a statistically significant negative association with inattention ($r = -.52$) and conduct problems ($r = -.69$) among a sample of 562 preschool students (Searle, Miller-Lewis, Sawyer, & Baghurst, 2013).

Studies using measures of student perceptions of student-teacher interactions demonstrated associations between interpersonal interactions and multiple subtypes of disengagement. In terms of affective disengagement, a longitudinal study that used SEM to analyze student response data from 383 students in grades 3 through 5 found that student perceptions of teacher support fully mediated the relationship between student aggression and dislike for school (Gest, Welsh, & Domitrovich, 2005). Specifically, student ratings of teacher supportiveness were negatively associated with teacher-rated student aggression ($\beta = -.17$), and positively associated with students' like or dislike for school ($\beta = .21$). In other words, aggressive elementary students only showed increased dislike for school over time when they perceived low levels of support from their teacher; aggressive children who perceived high teacher support showed no increase in their dislike for school (Gest et al., 2005).

In terms of behavioral disengagement, a longitudinal study of 233 middle school students from seventh to eighth grade reported linear regression results indicating that

students reported less disruptive behavior when they perceived greater teacher support (β = -.21), defined as the extent to which their teacher valued and established personal relationships with them (Ryan & Patrick, 2001). In terms of cognitive disengagement, MANOVA results from a sample of 185 adolescent students whose teachers received training on improving interpersonal interactions reported lower cognitive disengagement, operationalized as "a-motivation," though the study did not report a standardized estimate of the magnitude of the change (Tessier, Sarrazin, & Ntoumanis, 2010). A study of student response data from 273 fifth grade students in China and the United States reported follow-up ANOVA results that indicated students who reported lower social-emotional relatedness with their teachers interpreted the same teacher behaviors as more controlling than peers who reported higher relatedness (Zhou, Lam, & Chan, 2012). Though the authors did not report the magnitude of the difference, the results suggest that perceived relationship quality was related to students' interpretations of teacher behavior.

A single-group study of 185 students in 9th to 11th grade reported MANOVA results indicating that students reported significantly less amotivation after their teachers received training to increase interpersonal involvement than at the start of the school year, though, as also noted above, results did not include an estimate of the magnitude of difference (Tessier et al., 2010). In terms of behavioral disengagement, 44 elementary students in an intervention to promote positive student-teacher relationships showed decreases in student hyperactivity compared to a control group, but no difference in conduct problems or emotional difficulties (Seth-Smith, Levi, Pratt, Jaffey, & Fonagy, 2010). A randomized study of an intervention targeting 48 disengaged high school

students involved increased interpersonal teacher involvement and verbal praise (Murray & Malmgren, 2005). Compared with a control group, students involved in the intervention showed a significant increase in achievement across all their classes (partial $\eta^2 = .09$), even though their teachers did not report changes in measures of students' negative emotions or classroom engagement. This result suggests that addressing disengagement at the classroom level through more positive student-teacher interactions can have global positive effects for disengaged students.

Behavior management and responses to student behavior. Another aspect of the classroom environment associated with disengagement is the nature of the teacher methods for promoting desired student behaviors and responding to undesired behaviors. Several descriptive studies examined interview data and found that the techniques teachers use to promote student effort and reduce off-task and disruptive behavior are associated with disengagement. For instance, high school students reported greater disengagement in classes where teachers responded harshly to student behavior (Duffy & Ellwood, 2013). The students indicated that, in addition to conveying disrespect, teacher behaviors such as yelling, shouting, and the use of insults highlighted an off-putting power imbalance, since students were expressly prohibited from engaging in such behaviors (Duffy & Ellwood, 2013). While it may be unsurprising that harsh responses to student behavior may engender general disengagement, students' descriptions of other characteristics of behavior management reflect associations with different aspects of disengagement as well. In terms of behavioral disengagement for example, elementary

students who were interviewed reported misbehaving more frequently in classes where they perceived discipline practices or disciplinary guidelines as unfair (Reid et al., 2010b).

Only one study assessing the relationship between behavior management in the classroom and disengagement used a measure of student perceptions. The study involved 319 fourth and fifth graders and indicated that students exhibited greater amotivation toward a class when they perceived the teacher as using more directly controlling behavior, including frequent directive statements, interfering with students' preferred place to work, and not allowing critical and independent opinions (Assor, Kaplan, Kanat-Maymon, & Roth, 2005). Specifically, path analysis demonstrated that girls' reports of directly controlling teacher behaviors were significantly associated with negative emotions toward the class subject ($\beta = .54$) and that negative emotions were in turn associated with greater amotivation toward the subject that teacher taught ($\beta = .44$; Assor et al., 2005). Girls' reports of controlling teacher behaviors were also directly associated with amotivation above the partial mediation through negative emotions ($\beta = .24$, Assor et al., 2005). Results were similar for boys in this sample, with the relationship between perceived controlling teacher behaviors and negative emotions partially mediating the relationship between controlling behaviors and amotivation (Assor et al., 2005). This analysis suggests that students' affective disengagement mediated the relationship between how they perceived their teachers' behavior and their cognitive disengagement.

Several intervention studies addressed classroom structures to manage and respond to student (mis)behavior. It is important to note here that a large number of behaviorally oriented studies have examined changes in the frequency of disruptive or

off-task behavior in class (Maggin, Johnson, Chafouleas, Ruberto, & Berggren, 2012). While the study of practices to reduce disruptive and off-task behavior is germane to an exploration of disengagement, a comprehensive review of all such behavioral studies is beyond the scope of the current paper. Rather, this paper includes a review of two such studies that highlight classroom behavior management practices that may relate to disengagement. As previously described, disengaged students in classrooms with inconsistent behavior management may elicit environmental responses that reinforce disengagement. Readers interested in such a review of class-wide interventions for disruptive behavior are referred to Maggin et al., (2012).

Two studies examined the use of a group contingency reward strategy to reduce disruptive and off-task behavior (Christ & Christ, 2006; Leflot, van Lier, Onghena, & Colpin, 2013). In terms of behavioral disengagement, a single-case design study of three high school classes (grades 9-11) observed reductions in school students' disruptive behavior when students were allowed to earn free time as a class by remaining on task for a specified number of intervals during the first two-thirds of a lesson. A longitudinal study of 570 students from second to third grade randomly assigned classes to use the Good Behavior Game or not (Leflot et al., 2013). At the end of the two-year period, students in the treatment group with initially high off-task behavior showed no differences from their classmates in terms of aggression; however, in control classrooms, students with high off-task behavior showed significantly higher aggression than classmates (d = -.42; Leflot et al., 2013). A single-case design study examined the effectiveness teaching self-monitoring to reduce disengaged and problem behavior for

nine students across grades 2 to 5 (Rock, 2005). Visual analysis showed decreases in problem and/or disengaged behaviors for all nine students, with the negative behaviors increasing again during reversal periods (Rock, 2005). A notable aspect of these intervention studies is that they either involved increased opportunities for student choice, such as how to use class time (Christ & Christ, 2006; Leflot et al., 2013), or a more active student role in the process of monitoring behavior (Rock, 2005). Both of these practices are also discussed below in terms of classroom instructional practices shown to reduce disengagement.

Instructional methods and academic tasks. Interviews with students identified as disengaged, as well as typically engaged students, demonstrated that students experience greater disengagement in relation to specific styles of classroom instruction. These include instruction that emphasizes student passivity and extended listening (Davidson, 1999; Nardi & Steward, 2003), limits interactions with peers (Boaler, 2000; Nardi & Steward, 2003; Venkat & Brown, 2009), or emphasizes abstract concepts (Boaler, 2000). Students also report greater disengagement with tasks that are repetitive and monotonous (Boaler, 2000; Nardi & Steward, 2003), are too difficult, or feel restrictive and do not allow for student input (Venkat & Brown, 2009).

In terms of the different subtypes of disengagement, descriptive studies using interview data identified aspects of classroom instruction and academic work associated with affective disengagement, including increased boredom (Venkat & Brown, 2009). Descriptive and empirical studies identified associations between instruction, academic work and aspects of behavioral disengagement, including off-task behavior (Houssart,

2002), work avoidance (Guthrie et al., 2013; Meece & Miller, 1999), and disruptive behavior (Houssart, 2002; Reid et al., 2010b). Descriptive and empirical studies also observed associations between instructional format and aspects of cognitive disengagement, including a-motivation or devaluing course content (Cheon et al., 2012; Houssart, 2002; Tessier et al.; 2010) and student endorsements of performance goals (Meece & Miller, 1999). Notably, none of the prospective studies examining empirical associations between instruction and academic tasks and disengagement included measures of student perceptions of classroom elements.

Several articles reported experimental and quasi-experimental studies to examine the effects of changes in classroom instruction and academic work on aspects of disengagement. Chan and Au (2011) manipulated task difficulty for 60 elementary students ages 6-8 across three conditions. Using a Chi-square tests to compare groups, the study found that when teachers manipulated task difficulty by initially asking students to complete a sheet of 80 math problems and then asking them to complete only the first 20, student levels of work avoidance and carelessness decreased (Chan & Au, 2011). Two other studies found that high school students devalued course content less when teachers were trained to increase opportunities for student choice in class activities (Cheon et al., 2012; Tessier et al., 2010). Specifically, one randomized study with 1,158 middle and high school students, reported ANCOVA results that indicated students whose teachers participated in the training reported significantly lower a-motivation than their peers (η^2 = .03; Cheon et al., 2012). Another single group study examined changes in 185 high school students' reports of devaluing a course subject following their teachers'

participation in training to increase student choice in class (Tessier et al., 2010). The study reported MANOVA results that indicated a significant decrease in students' devaluing of the subject material from the beginning to the end of the school year, though did not report a standardized estimate of the magnitude of the change (Tessier et al., 2010).

Two intervention studies addressed multiple aspects of the nature of instruction and student tasks simultaneously and measured disengagement outcomes. A study involving 62 students between ages 11 and 12 demonstrated effects on affective disengagement of an intervention that addressed task difficulty through scaffolded reading strategy instruction and addressed collaboration through structured opportunities for peer interactions (Macaro & Erler, 2008). The study used a t-test to compare treatment and control group based on students' feelings toward the subject matter and found that treatment group students showed significantly lower negative emotions toward the subject than control students (Macaro & Erler, 2008).

A quasi-experimental study demonstrated effects on behavioral and cognitive disengagement for a sample of 1,159 seventh grade students (treatment = 854, comparison = 305) from an intervention in which their reading/language arts teachers were trained to (1) reduce difficulty by matching reading materials to students' instructional level, (2) provide increased opportunities for peer collaboration during lessons, (3) design introductory activities to highlight the relevance of subject matter to students, and (4) facilitate students' choice of reading materials and class activities (Guthrie et al., 2013). The study used structural equation modeling to examine the path of

the effect that participation in the treatment condition had on reading behavior and comprehension (Guthrie et al. 2013). Path coefficients demonstrated that participating the in treatment contributed to increased reading comprehension in part by reducing students' perception of reading as too difficult (b = -.09; Guthrie et al, 2013). Furthermore, the study found that students reported avoiding reading more when they perceived reading as too difficult (b = .22) and when they devalued reading (b = .49). In other words, the success of the intervention on increasing comprehension involved reducing students' cognitive disengagement in terms of their view of reading as too difficult. Cognitive disengagement—measured as students' perceptions of reading as too difficult and as devaluing reading—was also associated with behavioral disengagement, as students expressing higher cognitive disengagement reported avoiding reading more.

Conclusion

Disengagement indicates means by which students resist and withdrawn from school and learning activities. Research suggests that addressing disengagement in classrooms helps improve student outcomes, particularly increased effort on academic tasks and more positive attitudes toward academic subjects. Since disengagement constitutes the interaction of an individual and his/her environment, students are likely to develop disengagement differently, even within the same classroom. In order to effectively address disengagement, teachers need information on how students experience their classrooms.

Research on student perceptions has examined student rating scale data as a means to understand how students experience classrooms individually. Some research

has even identified that making changes to classroom based on student perceptions can benefit student with specific characteristics.

Measures of student perceptions would do well to attend to disengagement in the classroom. Attending to disengagement in the classroom should involve measuring student perceptions of classroom elements that previous research has shown are associated with disengagement, including: teacher-student interactions, behavior management approaches, and instructional methods and academic task characteristics. It is also worth including items that address some of the specific teacher behaviors associated with disengagement, including: yelling, expressing negative judgments about students, and using grades to compare students.

Chapter 3

Study 1: Adding Items to Increase Coverage of REACT

Student rating data can provide insight into how students experience their classrooms and how these day-to-day experiences relate to longer-term outcomes of interest (Goh & Fraser, 2000; Hattie, 2008). Studies have established several scales to collect data on student perceptions of the classroom, with each scale positing multiple dimensions of the classroom environment (Fraser, 2012; Nelson et al., 2014). Student ratings on these scales are associated with other student outcomes of interest, including academic achievement (Rentoul & Fraser, 1980) and different components of student engagement (Goh & Fraser, 2001). Based on the associations of students' classroom perceptions with achievement and engagement, some studies examined the use of student ratings to guide the practices of classroom teachers (Fraser & Fisher, 1986). A case study of one middle school classroom found a significant improvement in student perceptions (.25 SD) following an intervention in which the teacher used student rating data to modify classroom practices (Sinclair & Fraser, 2002). A study of 797 middle school students found that when teachers received feedback on student perceptions, along with information on research-supported practices related to the classroom, students showed a significant improvement in their perception of the classroom environment (Nelson, 2014).

Research involving student rating data has typically drawn on the concept of person-environment fit, which stipulates that behavior results from individual characteristics interacting with environmental characteristics (Dorman, 2002; Hunt, 1975). According to this framework, students are expected to enter the learning environment

with different individual needs. As these students' diverse needs encounter the available resources and stimuli of a given classroom, the students are expected to demonstrate different responses to the same shared environment. Those students whose needs are adequately met by the environment—those with person-environment fit—are expected to participate in the prescribed activities of the educational environment. On the other hand, those with poor person-environment fit, whose needs are not met, are expected to avoid the environment's prescribed activities and demonstrate behaviors that compete with desired participation (e.g. Skinner et al, 1998). Studies of student rating data as a tool to improve student outcomes have often focused on how teachers may use these data to guide modifications to the environment intended to better meet students' needs and increase person-environment fit (Fraser & Fisher, 1983, 1986). For example, Rentoul and Fraser (1980) demonstrated improved learning outcomes for students when teachers used student rating data to modify classroom practices. Notably, students' preferences for environmental characteristics exhibited a significant interaction with the nature of their actual classroom. In classrooms where teachers employed individualization, students who reported a stronger preference for individualized instruction showed greater learning gains than peers who did not endorse a preference for individualized instruction (Rentoul & Fraser, 1980).

Students with poor person-environment fit, who experience a "mismatch" of personal needs and environmental characteristics, are placed at greater risk for disengagement and withdrawal from the learning environment (Eccles et al., 1993; Skinner et al., 2008). Efforts to examine how students experience different classroom

elements should attend the needs and experiences of all students, so that classrooms not only support students who are already engaged but also promote improved engagement among those who are disaffected or disengaged. To ensure available supports meet the needs of all learners in a classroom, educators need information to gauge the quality and impact of their efforts to implement environmental supports. Toward that end, educators need to collect and use data on the relative match *and* mismatch that contribute to promote or inhibit the engagement and disengagement.

The *Responsive Environmental Assessment for Classroom Teaching* (REACT; Christ et al., 2014) is a student rating measure that has been used in research to modify the classroom environment (Nelson et al., 2014). Previous research with REACT established a measurement model with six first-order factors interrelated through the second-order factor of the overall Classroom Teaching Environment (Nelson et al., 2014). The first-order factors are Classroom Management, Instructional Presentation, Goal Setting, Differentiated Instruction, Formative Feedback, and Instructional Enjoyment, which are interrelated through the second-order factor of Classroom Teaching Environment. This factor structure was based on items that addressed supportive aspects of the classroom environment with a focus on instructional practices, and no items that addressed unsupportive classroom experiences or interpersonal relationships. Subsequent review of the REACT indicated the need to add items that would correlate more strongly with disengagement (Demers, 2013). As described below, review of the literature on disengagement indicated two areas from which to develop items: unsupportive and unpleasant classroom experiences, and interpersonal relations with teachers.

The Need to Address Unsupportive and Unpleasant Classroom Experiences

To better identify students at risk for disengagement, student rating scales may need to include items that address unsupportive and unpleasant experiences of the classroom, as well as supportive and pleasant experiences. Previous research indicates that students are more likely to be disengaged when they perceive teachers view them judgmentally, hold low expectations regarding their aspirations, communicate doubt about their abilities, and convey disrespect (Davidson, 1999; Duffy & Elwood, 2013; Wallace et al., 2012). Students are also more likely to be disengaged when they perceive teachers only focus on students' academic responsibilities without demonstrating interest in students' personal lives (Duffy & Elwood, 2013; Wallace et al., 2012). Other classroom factors that contribute to disengagement include limited opportunities for student autonomy and excessive teacher control (Assor et al., 2005; Cheon & Reeve, 2013; Zhou et al., 2012). Such elements also include instructional practices that emphasize student passivity or that are excessively repetitive, monotonous, or difficult (Boaler, 2000; Chan & Au, 2011; Guthrie et al., 2013; Nardi & Steward, 2003; Venkat & Brown, 2009). Students are also more likely to be disengaged when they perceive teachers emphasize test performance and grade-based comparisons between students to justify school work and effort (Duchesne, Ratelle, & Roy, 2012; Ryan & Patrick, 2001; Ryan & Shim, 2012). Finally, students are more likely to be disengaged when they perceive teacher feedback that emphasizes a view of ability or intelligence as fixed, rather

than subject to change through effort (Henderlong & Lepper, 2002; Mueller & Dweck, 1998).

Student rating scales that address such negative kinds of classroom experiences may yield data educators can use to better identify mismatch, as well as fit. Such items may also allow for greater variation in student responses on classroom environment measures, which would allow for easier identification of individual patterns in student perceptions. Measures of students' classroom experiences generally lack items that address unsupportive classroom experiences. Such measures are likely to under-represent the range of classroom experiences, especially the experiences of students who are unhappy or disengaged. For example, student ratings on the REACT (Christ et al., 2014) predicted engagement, but not disaffection or disengagement (Demers, 2013). It is likely that REACT was less indicative of classroom experiences among students who were disengaged. Their experiences might not only be "low" in terms of supportive practices, but also reflect the presence of negative or unpleasant experiences. This hypothesis can be tested with a replication and extension of the previous study, using an updated version of REACT that includes statements about negative classroom experiences (e.g., "Students pick on each other without my teacher noticing"). This work is an important step in efforts to address the mismatch between disengaged students and their classroom environment.

The Need to Address Perceptions of Interpersonal Relationships with Teachers

Student-teacher relationship quality is an important component of the classroom environment (Wentzel, 1997) that is associated with both engagement and disengagement.

A large study of 827 first grade classrooms that used an observational measure of the classroom environment found that students were more behaviorally engaged in classrooms where adults exhibited greater emotional support for students (National Institute of Child Health and Human Development & Early Child Care Research Network, 2002). Analysis of student rating data from 353 students in fifth through eighth grade indicated that students who perceived greater personal support from teachers were more optimistic about their likelihood to succeed in the class and exhibited higher behavioral engagement, as rated by their teachers (Goodenow, 1993).

Furthermore, relationships with teachers may be of particular significance for students who are at risk for disengagement and school failure. A study in which teachers worked to increase positive interpersonal interactions with 24 high school students at risk for school failure found a significant increase in these students' overall GPA across all classes, compared to a control group of at-risk students (Murray & Malmgren, 2005). A study of 383 third- through fifth-graders found that aggressive students who perceived high teacher support did not show increased dislike for school, while aggressive students who perceived low teacher support exhibited a significant increase in their dislike for school over the course of the year (Gest et al., 2005). Given the apparent sensitivity students at risk for failure demonstrate relative to these relationships, measures that contain items about how students perceive their interpersonal relationship with teachers, or teachers' concern and support, may better account for factors associated with engagement and disengagement.

Purpose

The purpose of the current study was to examine a cross-validation for the factor structure of REACT and explore the use of additional items related to the students' classroom experiences. Specifically, the cross-validation work was done with an alternate group of middle school students; and, specifically, the additional items were designed to explore unpleasant and unsupportive experiences, along with student perceptions of teacher concern and relational support. The following research questions guided the study.

1.1 To what extent does the measurement model of the original version of REACT replicate with a new sample?

1.2 To what extent did items related to unpleasant and unsupportive experiences along with student perceptions of teacher concern and relational support fit within the original or alternate factor structures for REACT?

1.3 What was the most viable approach to measure and model a broader range of student experiences and perceptions, which include the prior aspects of REACT along with unpleasant and unsupportive experiences and student perceptions of teacher concern and relational support?

1.4 To what extent did the supplemental aspects of student experiences and perceptions measured through newly added items enhance predictions of student engagement and disengagement in class?

Methods

Participants

Students were recruited from 44 middle school classrooms in the Suburban Midwest. Teachers used the REACT as part of their program of professional development for the year. The authors offered schools $25 gift cards for each class that participated. The schools provided de-identified student responses. A notice went home to parents and an announcement was made to students to inform them that the de-identified data would be used for research. Parents and students had the opportunity to exclude their data from research. A total of 1160 students (48% female) in grades six, seven, and eight (39%, 33%, 28%, respectively) in 44 classrooms taught by 23 teachers completed the student measures (see Table 1). Data on race was not available for individual students through the online forms students and teachers completed due to a survey error. Data on race for each of the two schools in the study was retrieved from the National Center for Education Statistics, indicating both school were majority White (80% and 67%, respectively), with Asian/Pacific Islander the next largest group (7% and 16% respectively; see Table 2). The authors established minimum sample size of 590 participants to ensure 10 participants per variable (item) on the REACT for purposes of the factor analyses.

Measures

Responsive environmental assessment of classroom teaching (REACT). Each student completed a revised version of REACT (Christ, Nelson & Demers, 2012), which contained 23 of the 27 items published in Nelson et al., (2014). The 23 items from the

original version of REACT are presented in Appendix A. The first version of REACT, published in Nelson et al. (2014), demonstrated acceptable psychometric properties. A confirmatory factor analysis revealed acceptable fit statistics for the six first-order factors of Positive Reinforcement (five items), Instructional Presentation (six items), Goal Setting (four items), Differentiated Instruction (five items), Formative Feedback (three items), and Instructional Enjoyment (four items). The standardized factor loadings were greater than .49. Internal consistency for the full scale was .94, and test-retest reliability was .77. Following the publication of this version of the instrument, the authors eliminated four items based on the similarity of their content to other items on the scale, to make the scale more parsimonious.

Experimental items. Thirty-six experimental items supplemented the REACT items. They were all presented on the same form. Fifteen of those supplemental items were intended to address unsupportive and unpleasant experiences of existing factors, and 11 items were intended to address student perceptions of teacher concern and support. The remaining ten items had been developed as part of another research study to increase the coverage of the original REACT factors. These additional items are presented in Appendix B. The processes to develop those items are presented within the procedures section below.

Student engagement and disengagement. Each student completed the *Measure of Engagement Versus Disaffection with Learning - Student Report* (Skinner, Kindermann, & Furrer, 2009). The Measure of Engagement Versus Disaffection with Learning (EvsD) student report form is a 27-item student self-report rating scale

comprised of four subscales: Behavioral Engagement (five items), Emotional Engagement (five items), Behavioral Disaffection (five items), and Emotional Disaffection (twelve items) (Skinner et al., 2009). The subscales for Behavioral Disaffection and Emotional Disaffection are labeled as Behavioral "Disengagement" and Emotional "Disengagement" in the following sections, which is consistent with the manner in which the developers of this measure present the term "disaffection" interchangeably with definitions of "disengagement" from other studies (Skinner et al., 2009; Skinner & Pitzer, 2012). The student report scale appears in Appendix C. Items within each subscale are averaged to determine scores in each of the four domains. The authors of the current study selected the EvsD because it assesses students' engagement and disaffection in a specific class, unlike other engagement scales that assess students' engagement in school more globally (e.g. Appleton et al., 2006). Internal reliability coefficients for the four subscales on the student report form ranged from .61 to .85 (Skinner et al. 2009). Test retest reliability was not reported at the time of this study.

Implementation Procedures

Item development. The authors generated experimental items based on research regarding student engagement and disengagement at the classroom and school level, reviewed above. A researcher with experience in student engagement, and three graduate students in school psychology reviewed the items and provided feedback on coverage and wording. Ten of the new items were piloted during administrations of REACT in two middle schools. Following this process, 30 items were reworded for clarity before being included in the study.

Data collection. Participating students completed both measures through a secure online survey during one class period. Each student received a unique identification number, which teachers instructed students to enter at the start of the data collection session. Students were informed that their individual responses would be recorded anonymously. Each item on the form allowed students to play an audio recording of the item to accommodate those with reading difficulties.

Results

The results are presented in three parts. The results for cross validation and scale development are presented in the first two parts. The results for engagement and disaffection models are presented last.

There were 1160 student participants who responded to 86 items on REACT (23 items), experimental (36 items), and EvsD (27 items) for a total of 99,760 possible responses. Of those, 1795 were missing (1.8%). Two methods of missing data analysis strongly supported data to be missing completely at random—a shadow matrix, and a matrix plot (Zhang, 2015). Specifically, visual analysis of the matrix plot suggested missing item responses—shown in red—did not cluster according to values on the student characteristic variables of year in school, grade in class, teacher, or gender (see Figure 1). More detailed examination of the shadow matrix comparing missing values across variables reflected very small correlations between missingness on individual items and missingness on grade, year in school, and teacher, suggesting that missing responses on items were not associated with missing responses on these other variables (see Table 3). Correlations ranging from .15 to .18 in this matrix reflected small

associations between the likelihood that a respondent omitted responses on the last 20 items and the likelihood that he or she omitted a response to the item asking for gender (see Table 3). Further inspection of individual responses indicated that this result was attributable to only one missing response on the gender item, whereas all other students in the sample had completed this item. Finally, examination of the second shadow matrix comparing missing responses with values on the other variables, similarly revealed very small correlations, indicating little likelihood that missing responses were any more or less likely for students with different grades, teachers, or year in school (see Table 4).

Full Information Maximum Likelihood (FIML) was used to impute missing values for CFA. Two missing data methods—multiple imputation by chained equations and listwise deletion—were contrasted through comparison of regression analyses results. Results were nearly identical under each approach. For example, comparing the models for Behavioral Outcomes, of the nine coefficients estimated across the three models, only three exhibited differences greater than 1.5% between the two missing data approaches. Estimates of adjusted R^2 differed only for the first model, which contained only the grade variable, with the listwise approach showing an adjusted R^2 of .04 and the multiply imputed approach showing an R^2 of .05. Adjusted R^2 was the same for the models including REACT and CAIRS scores. Therefore, the decision was made to employ the more conservative listwise deletion method. Descriptive statistics for the retained items and correlations were based on complete records. All experimental items corresponding to unpleasant and unsupportive classroom experiences were reverse-scored prior to

analysis. Normality of items and scale scores were examined in terms of skew and kurtosis and are described in the relevant sections below.

Scale Development and Item Analysis

Existing and experimental items to measure student perceptions and classroom experiences were examined through multiple stages, including (a) CFA of existing REACT items, (b) analysis of experimental items, (c) factor analysis of REACT including existing and experimental items, and (d) subsequent factor analysis of experimental items in a new instrument.

Factor analysis: REACT. CFA was used to cross validate the previously reported REACT factor structure (Nelson et al., 2014). The recommended indices for model fit were RSMEA, SRMR, CFI, TLI, and Chi-square (Hu & Bentler, 1999); however, as noted by Bentler and Bonett (1980) the Chi-square test, which is based on sample size, is very likely to indicate misfit as sample size increases, and is thus thought to be an overly stringent test of model fit, prone to indicating misfit with large sample sizes. The sample in the current study was large, so the Chi-square test was considered too sensitive and likely to be an overly stringent test. Although the test was not used as a primary indicator, the results of that test were reported for informational purposes. Results indicated RSMEA of .06, SRMR of .05, CFI of .92, TLI of .90, and a statistically significant Chi-square test ($\chi^2 =$ 872.285 and $df = 194$, p-value < .001). With the exception of the Chi-square test, there was acceptable model fit with six first-order factors and one second-order factor. Descriptive statistics for the items in REACT,

including response frequencies, are reported in Table 5. Factor loadings by item and first-order factors are reported in Tables 6 and 7.

Item analysis: experimental items. Descriptive statistics and item-total correlations were used to identify items that functioned poorly. Five items had item-total correlations below .25 and were subsequently removed. Five more items exhibited evidence of non-normality, with either skew greater than two or kurtosis greater than seven. These items were also removed. This process left a total of 26 experimental items, which included ten of the items intended to address unsupportive and unpleasant classroom experiences and seven of the items intended to address positive and negative aspects of teacher concern and relational support.

Factor analysis: REACT with experimental items. In the next stage, the 15 experimental items intended to address unsupportive and unpleasant classroom experiences corresponding to three of the existing six first-order factors were added to the REACT. The items had been developed based on the content of existing items within each of these three factors. The items were assigned to the Classroom Management factor (four items), Differentiation factor (three items) and the Formative Feedback factor (eight items). CFA was then used to test the fit of factor structure of REACT following the addition of these new items to determine whether they fit within the existing factor structure as intended. Results indicated poor model fit (RSMEA = .06, SRMR = .07, CFI = .76, TLI = .74). Five items with factors loadings below .30 were removed and model fit re-examined. Results still indicated poor model fit (RSMEA = .06, SRMR = .06, CFI

= .83, TLI = .82). Thus, it was determined that the new items did not fit with the original factor structure of REACT, which had six first-order and one second-order factor.

Next, the seven additional items that were intended to assess positive and negative aspects of teacher concern and relational support were also added to REACT. These items were expected to comprise a new first-order factor within the second-order factor of the Classroom Teaching Environment, as the items asked students to rate relational support their teacher offered—such as attempts to relate to the student personally—whereas the existing six first-order factors in the measurement model for REACT attended to instructional supports. Consequently, an alternate model with seven first-order factors and one second-order factor was then tested. The seventh factor contained seven experimental items for positive and negative aspects of teacher concern and relational support. As in stage two, the 15 experimental items for unpleasant and unsupportive experiences were assigned to the three first-order factors. Results also indicated poor model fit for this factor structure (RSMEA = .05, SRMR = .06, CFI = .83, TLI = .82). The results indicated that the experimental items did not fit with REACT scale.

Factor analysis: social and affective items. The substantive content of the experimental items was examined. The content of the items were intended to relate substantially to social and affective characteristics of the classroom. The author examined the experimental items along with those that comprised the Instructional Enjoyment factor for REACT. Since the three items within the Instructional Enjoyment factor asked students to report on emotions relative to class, the author expected these

items to fit better within the affective and relational domain of the other items under consideration. The initial pool of 31 experimental and enjoyment items that had acceptable skew and kurtosis was reduced through a process of iterative development (see Table 8) to 19 items. Items were assessed as addressing instructional practices—as opposed to social and relational practices—based on their wording. Items that asked students to rate teacher behaviors related to the delivery of instructional material (e.g. "We review the key points of the lesson before class ends." and "Classwork and homework clearly build toward a goal that my teacher explained.") or feedback on performance on academic tasks (e.g. "If I ask for help my teacher tells me to read the directions again." and "My teacher gives me feedback that helps me improve.") were eliminated from the pool of items considered for subsequent analysis.

Four items that addressed aspects of academic work were also retained. These items were intended to address students' perceptions of the level of challenge of their work in that class (e.g. "Lessons are too hard"). These items were retained, since perceptions of work as too challenging have been associated with student disengagement in prior research, as noted above (e.g. Guthrie et al., 2013). Since a primary aim of the current study was to develop a student rating scale that assessed aspects of classroom experience associated with student disaffection, the author expected these items would contribute information relevant to the scale being developed.

Table 9 presents the response frequencies and item-total correlations for those items, and Table 10 presents the intercorrelation matrix for all retained items. The items were grouped into four hypothesized first-order factors, with these four factors grouped

within one hypothesized second-order factor. The CFA for the hypothesized factor structure indicated an acceptable model fit (RSMEA = .05, SRMR = .05, CFI = .94, TLI = .93), which was a better fit than the baseline unidimensional model (RSMEA = .11, SRMR = .10, CFI = .64, TLI = .59; see Table 9).

The total scale was labeled *Classroom Affect and Interactions Rating Scale* (CAIRS). The factor loadings by item ranged from .43 to .90 and were all significant at the $p < .001$ level (see Table 12). The four first-order factors were labeled Relational Support, Social Climate, Appropriate Challenge, and Enjoyment, with the last factor comprised of the three items within the Instructional Enjoyment factor on REACT. The second-order factor was labeled the Classroom Social Environment, to complement the second-order factor on REACT, the Classroom Teaching Environment. The loadings for these four first-order factors on the second-order factor of the Classroom Social Environment ranged from .37 to .89 (see Table 13). Notably, the factor loading for the Enjoyment factor on the second-order Classroom Social Environment factor in CAIRS was greater than the loading of the Instructional Enjoyment factor on the second-order factor of the Classroom Teaching Environment in REACT, though the same three items comprised this factor in both cases (see Tables 7 and 13). CAIRS was used in subsequent analyses to answer question 1.4 and examine whether REACT and CAIRS together were more strongly associated with student engagement and disaffection than REACT alone.

Associations with Engagement and Disengagement

The final stage of data analysis employed hierarchical regression to test the extent to which the revised version of REACT better predicted student engagement and

disaffection in class, compared to the previously published version of the measure. Consistent with the method used in Demers (2013), a series of regression models on four different outcome variables were tested to examine the relationship between student classroom experiences and their classroom engagement and classroom disaffection. In each model, students' self-reported grade in the class was entered as a control.

Within the 1160 cases, 57 (5%) were missing more than 80% of responses to the outcome measures and were removed from further analyses. All other cases were retained and used for subsequent analysis. The four outcome variables were behavioral engagement, emotional engagement, behavioral disengagement, and emotional disengagement. Following the method used by Skinner, et al. (2009), engagement and disaffection scores were calculated as the average of each student's responses to the corresponding items on the instrument. Review of descriptive statistics for the four outcome variables and REACT and CAIRS suggested they sufficiently met assumptions of normality for inclusion in the regression analyses (see Table 14. Students' self-reported achievement in class was severely negatively skewed (see Table 14). Nonetheless, it was retained in the models as a control, rather than an independent variable tested as part of the current study, since an aim of the study was to examine the extent to which REACT and CAIRS predicted engagement and disengagement beyond students grades—data which teachers would have available even without student responses to the two rating scales.

In addition to the linear models, an intercorrelation matrix was generated to examine the magnitude and significance of correlations between predictor and outcome

variables, and is presented in Table 15. Pearson correlations were generated for each comparison, and *p*-values were adjusted for multiple comparisons, using a Holm adjustment. The correlation between REACT and CAIRS scores and each outcome variable was in the expected direction, though the magnitude of correlations varied considerably (*range*, .39 to .69; Table 15). The Pearson correlations between behavioral engagement and REACT and emotional engagement and REACT were .41 and .64, respectively, which were both significant ($p < .001$). The Pearson correlations between behavioral disengagement and REACT and emotional disengagement and REACT were .39 and .52, respectively, which were both significant ($p < .001$) after adjusting for multiple comparisons (see Table 15). The Pearson correlations between behavioral engagement and CAIRS and emotional engagement and CAIRS were .41 and .65, respectively, which were both significant ($p < .001$). The Pearson correlations between behavioral disengagement and CAIRS and emotional disengagement and CAIRS were .47 and .69, respectively, which were both significant ($p < .001$; see Table 15) after controlling for multiple comparisons.

Ratings of engagement and disengagement were then examined to determine whether they were significantly clustered by teacher. The intraclass correlation (ICC) for each of the four outcome measures was below .16, indicating that clustering by teacher or by classroom accounted for less than 2.6% of the variance in the outcome measures. Based on the small amount of variance in engagement and disengagement attributable to teacher and class, the authors excluded teacher as a covariate in the subsequent models and determined multiple regressions models were appropriate. Notably, multilevel

modeling of student achievement within the current sample demonstrated a comparably low proportion of variance in student grades attributable to clustering by classroom (3%), which was unexpected in light of previous research estimating classroom effects accounting for between seven and thirteen percent of variance in student achievement on average (Nye, Konstantopoulos, & Hedges, 2004).

Multiple regressions: engagement and disengagement. Regression models were used to examine how well CAIRS significantly predicted each subtype of engagement and disaffection after controlling for students' responses on REACT and their self-reported grade for the class about which they completed REACT. The final model for each of the four outcomes was examined for model fit in several ways. In all models, the variance inflation factors for each predictor was under 2, well below the common threshold of 10 (Hair, 1995), indicating there was not significant multi-collinearity among the predictors. In addition, density plots of the studentized residuals from each model were generated and indicated residuals met the assumption of normality. F-tests using ANOVA to compare the three models generated for each outcome variable indicated that models containing CAIRS scores accounted for additional variance that exceeded the decrease in degrees of freedom from adding an additional predictor. Regression results for behavioral and emotional engagement are presented in Tables 16 and 17 respectively, and regression results for behavioral and emotional disengagement are presented in Tables 18 and 19.

Regression outcomes for engagement. The multiple regression analysis including only students' self-reported class grade accounted for approximately 5% and 2% of the

variance for behavioral and emotional engagement, respectively (see Tables 16 and 17, Model 1). Adding REACT scores to the models accounted for an additional 15% of the variance in behavioral engagement and additional 40% of the variance in emotional engagement (see Tables 16 and 17, Model 2). REACT was a significant predictor in both models ($p < .001$).

Adding CAIRS scores to the models accounted for an additional 1% of the variance in behavioral engagement and 3% of the variance in emotional engagement (see Tables 16 and 17, Model 3). CAIRS scores were significant predictors in both models ($p < .001$). The standardized coefficients in the final models indicated that a one *SD* increase in a student's REACT score predicted a .28 *SD* increase in behavioral engagement and a .47 *SD* increase in emotional engagement. Correspondingly, a one *SD* increase in a student's CAIRS score predicted a .17 *SD* increase in behavioral engagement and a .26 *SD* increase in emotional engagement. Notably, though students' self-reported class grade remained a significant predictor of students' behavioral engagement, self-reported grade was not a significant predictor of emotional engagement after accounting for REACT and CAIRS.

Regression outcomes for disengagement. The multiple regression analysis including only students' self-reported class grade accounted for approximately 4% and 3% of the variance for behavioral and emotional disengagement, respectively (see Tables 18 and 19, Model 1). Adding REACT scores to the models accounted for an additional 14% of the variance in behavioral disengagement and 25% of the variance in emotional disengagement (see Tables 18 and 19, Model 2).

Adding CAIRS scores to the models accounted for an additional 5% of the variance in behavioral disengagement and 16% of the variance in emotional disengagement (see Tables 18 and 19, Model 3). The standardized coefficients in the final models indicated that a one *SD* increase in a student's REACT score predicted a .17 *SD* decrease in behavioral disengagement and a .17 *SD* decrease in emotional disengagement. Correspondingly, a one *SD* increase in a student's CAIRS score predicted a .31 *SD* decrease in behavioral disengagement and a .53 *SD* decrease in emotional disengagement, after controlling for the effect of REACT. Students' self-reported class grade remained a significant predictor of both behavioral disengagement and emotional disengagement after accounting for REACT and CAIRS.

Discussion

The purpose of the Study 1 was to cross validate REACT and explore the use of supplemental student ratings to enhance predictions of student engagement and disaffection. The authors developed items intended to measure aspects of the classroom environment excluded from a previous version of REACT. Specifically, those items focused on unsupportive and unpleasant experiences classrooms, along with student perceptions of teacher concern and relational support. Results of CFA and regression analyses provide cross validation evidence for the original REACT scale (Nelson et al., 2014). These results further support the use of REACT as a tool to collect student rating data about classroom elements. Results did not support the use of experimental items to supplement the REACT scale. Instead, iterative development established a separate scale with a focus on the social affective experience of the class. Student ratings on the new

CAIRS scale explained a small portion of unique variance on student engagement, but modest to large portions of unique variance on student disaffection. These results were observed after controlling for class grades and REACT ratings. Implications are discussed in more detail in Chapter 5.

Chapter 4

Study 2: Testing Associations Between Student Responses and Student Characteristics

Research has demonstrated educators may use student rating data to modify instructional environments to better accommodate student needs (Fraser & Fisher, 1983; Nelson, 2014; Padron, Waxman, & Huang, 1999; Rentoul & Fraser, 1980; Sinclair & Fraser, 2002). Student rating data about classrooms is related to outcomes such as engagement and achievement (Goh & Fraser, 2000; Rentoul & Fraser, 1980), so that changes in how students perceive their environment may correspond to improvements in these other areas as well. Classroom environment tools that measure student perceptions, then, may offer educators data that may be used to modify classrooms so as to improve outcomes such as engagement and achievement (Fraser & Fisher, 1986; Waldrip et al., 2008).

Classroom interventions that used student rating measures have primarily focused on classroom-level data and interventions (Fraser & Fisher, 1986; Nelson, 2014). A small body of research has used student rating data to tailor classroom modifications for different groups of students, namely boys and girls (Sinclair & Fraser, 2002). Research, however, has yet to explore the extent to which educators may use such data to change the classroom environment to better meet the needs of students exhibiting risk factors for educational failure or disengagement. To explore the possibility of using student rating data to inform more individualized interventions, research must first establish the extent

to which student rating scale data may be used to distinguish between students based on identified risk factors.

Individual Responses to Shared Environments

The theoretical basis for using student rating data to examine the classroom environment includes an emphasis on the idea that student responses to the classroom are conditioned in part on individual student characteristics (Fraser, 1998). Classroom research using student perception data often cites the notion of person-environment interaction and person-environment "fit" (Dorman, 2002; Fraser & Fisher, 1986, p. 198; Hunt, 1975). Hunt (1975) proposed using the paradigm of "behavior is a function of the person and the environment" (p. 217) to guide the study of interactions in the realm of educational contexts. This paradigm views the person and the environment as exerting reciprocal influences, such that the person alters the environment, while the environment influences the person. Based on this paradigm, Hunt also advocated for differentiation in education, arguing that judgments of which instructional approaches are superior should also include considerations of "For whom?" (Hunt, 1975 p.218).

Pervin (1968) and Jahoda (1961) drew on the notion of person-environment "fit" to characterize the manner in which some individuals might feel at ease within certain environments, and be more likely to invest themselves and feel satisfied in a given context compared to others. Pervin cited numerous studies showing that manipulating aspects of instruction and task characteristics resulted in different levels of effort and performance from individuals with different levels of anxious characteristics. Taken together, this theoretical and empirical work sets out a framework whereby individual

behavior and responses are conditioned both on personal characteristics and environmental stimuli. Within such a framework, students would be expected to demonstrate different responses to shared environments, as each student's individual characteristics would interact differently with the same environment.

Evidence of Person-Environment Fit

Research within schools and classrooms has demonstrated results consistent with the person-environment interaction framework. For example, in a study of student response data from 273 fifth grade students, post-hoc ANOVA results indicated that students who reported lower social-emotional relatedness with teachers rated descriptions of teacher behaviors as more controlling than peers who reported higher relatedness (Zhou et al., 2012). A study of 285 seventh through ninth grade students found that placement in a classroom with high individualization was associated with increased learning outcomes for students who preferred individualized instruction, but with reduced learning for students who preferred more traditional whole-class instruction (Rentoul & Fraser, 1980). Such differences in student responses to environmental factors may indicate that some students are more susceptible to variations in the environment than others. A study of 1,750 elementary and 1,347 middle school students reported that elementary students who perceived low levels of teacher support were twice as likely to be disaffected in class as middle school students perceiving similar levels of teacher support (Klem & Connell, 2004).

Some results pointed specifically to how at-risk students experience aspects of the classroom environment differently than their peers. A study of 383 third through fifth

grade students found that the interaction of student aggressiveness and perceptions of teacher support fully mediated the relationship between aggression and dislike for school, such that aggressive students who perceived high teacher support did not show increased dislike for school (Gest et al., 2005). In addition, a study of 563 fourth and fifth grade students compared the classroom perceptions of resilient students–defined as students with identified risk factors who were, nonetheless, high achieving–and their less resilient–or low achieving–peers (Padron et al., 1999). The study found resilient students had significantly more positive classroom perceptions (Padron et al., 1999). Taken together, these results suggest that differences in how students perceive the classroom environment may be associated with different outcomes for students at-risk for disengagement or low achievement.

Student Perception Data as a Tool to Personalize Classrooms

Previous research using student rating data to guide modifications to classroom practices typically focused on collecting data and making modifications at the whole class level (Fraser & Fisher, 1986; Nelson, 2014). For example, in a case study of one science classroom, the teacher used data from the *My Class Inventory* (MCI; Fraser, 1982) to inform an intervention to modify the classroom (Fraser & Fisher, 1986). The study found significant changes at post-test in student ratings of the two classroom aspects the intervention targeted (Fraser & Fisher, 1986). A study of 797 students in 31 middle school classrooms using the *Responsive Environmental Assessment for Classroom Teaching* (Christ et al., 2014), involved an intervention in which teachers were provided descriptions of research-supported classroom practices associated with six different

classroom aspects (Nelson, 2014). The study found a statistically significant but small improvement in student ratings within those classrooms where teachers received feedback on student perceptions and had access to the catalogue of research-supported classroom practices (Nelson, 2014).

Despite these studies' positive effects, using student perception data at the whole class level may overlook uses of such data to examine more individualized experiences for students at risk for educational failure. A limited number of studies have reported classroom interventions designed to differentially meet the needs of different groups of students based on student perception data. A case study of one middle school classroom found not only that boys and girls perceived the classroom differently, but that teacher efforts targeted to change specific classroom elements for each group were associated with a .25 *SD* improvement in student ratings at post-test for the targeted elements (Sinclair & Fraser, 2002). While student gender may be associated with differences in student perceptions, other variables related to student risk for academic failure may also be associated with systematic differences in student perceptions (Padron et al., 1999). Research has yet to explore the extent to which variation in responses to student rating measures may identify risk factors such as disability status or classroom behavioral difficulties. Analyses of student rating data that discriminate between students with different risk factors could contribute to efforts to use student rating measures to better personalize classrooms to meet different student needs.

Purpose

The purpose of the current study was to examine the relationships between student characteristics that might function as risk factors for disengagement and student ratings of the classroom environment. Data were collected and analyses conducted to evaluate differences among student responses based on Gender, Special Education and accommodation status, class achievement, classroom social behavior, and class participation. The authors selected these grouping variables based on review of research regarding risk factors for disengagement (Finn, 1993; Rumberger & Lim, 2008). The authors expected that students identified with these risk factors for disengagement would respond differently to rating items about the classroom environment, as compared to students not identified with these risk factors. Specifically, it was expected that students identified with risk factors for disengagement would endorse more negative perceptions of the classroom environment—as measured by REACT and CAIRS—than students without such risk factors. The following question guided the study:

2.1 To what extent do students respond differently to rating items about the classroom environment based on student factors including: gender, Special Education and Section 504 status, academic achievement, classroom social behavior, and observed participation in class?

Methods

Participants

Student responses were drawn from the same sample analyzed in Study 1. The author offered teachers $50 gift cards to incentivize their completion of teacher-report measures of special education status, social behavior, academic grades, and teacher-rated effort in class for their students who had completed the student measures. Twenty-one teachers completed teacher-report measures for 744 students (48% female) from 36 classrooms in grades six, seven, and eight (26%, 31%, and 37%, respectively; see Table 18).

Measures

Student Perceptions of the Classroom Environment. Student responses to the *Responsive Environmental Assessment for Classroom Teaching (REACT) and the Classroom Affective Interaction Scale (CAIRS)* were drawn from the same sample analyzed in Study 1. Both those measures are described in detail in the Study 1 methods section, and individual items along with item and factor loadings appear in Tables 3-5 and 10-11.

Class participation. To gain a better sense of each student's observed behavioral engagement in class, each teacher completed the Behavioral Engagement and Behavioral Disaffection subscales of the *Measure of Engagement Versus Disaffection in Class - Teacher Report* (Skinner et al., 2009) for each student in his/her class. Each subscale contains five items that correspond to the five items on the student report form of the same measure. Internal reliability coefficient for the Behavioral Engagement subscale on

teacher report form was .88 (Skinner et al., 2009). Items on the Behavioral Disaffection subscale were reverse scored and the average of the ten total items was used as a rating of each student's participation in class.

Classroom social behavior. To measure students' level of behavior difficulties in class teachers were asked to complete the five items from the Social Behavior subscale of the Social and Academic Behavior Risk Screener (SABRS; Kilgus, Chafouleas, & Riley-Tillman, 2013). Items from this subscale appear in Appendix F. Initial evaluation of this subscale with a sample of 243 kindergarten through fifth graders showed strong reliability (Cronbach's alpha .94) and strong association with an established measure of problem behaviors (Kilgus et al., 2013). Consistent with standard procedures for this measure, teachers rated each item on a scale of zero to three, with item scores summed to obtain the overall subscale score.

Additional student characteristic data. Each teacher also supplied information on the following student characteristics via an online form that saved to a protected database: academic achievement, Special Education and Section 504 accommodation status, and gender.

Implementation Procedures

As part of the data collection procedures described in Study 1, each student received a unique identification number, which teachers instructed them to enter at the start of the data collection session. Teachers retained a list with the correspondence of all identification numbers with student names. Each teacher completed an online form with all teacher response items, using the students' identification numbers.

Analytic Procedures

Item analysis examined associations between student response patterns and different demographic and/or risk factors. Specifically, the authors tested the strength of the association between the student-level risk factors for disengagement and students' responses to the REACT and CAIRS, through two series of OLS regression models. The variables tested as possible predictors of students' classroom perceptions on CAIRS and REACT included gender, Special Education and accommodation status, academic achievement, classroom social behavior, and class participation. The authors used a stepwise model building approach to test the relative contribution of each variable to students' perceptions of the Classroom Social Environment on CAIRS and to students' perceptions of the Classroom Teaching Environment on REACT. Predictors were ordered based on the extent to which they were expected to remain stable, with less malleable characteristics, such as Gender and Special Education and accommodation status entered first and more malleable characteristics, such as classroom social behavior and class participation, entered later.

Results

Descriptive statistics for the sample, including frequencies for the dichotomous variables, student gender, and Special Education and Section 504 accommodation status appear in Table 20. The means, standard deviations, and ranges for class achievement, classroom social behavior, class participation, and overall scores and subscale scores for REACT and CAIRS appear in Tables 21 and 22. The continuous variables for class achievement and classroom social behavior were both highly skewed. A large proportion

of the sample (64%) had grades over 3.8 out of 4.0, while a similarly large proportion (70%) had ratings of classroom social behavior above 15 out of 18—exceeding the mean of 13 of the measure's normative sample (Kilgus et al., 2013). Since achievement and classroom social behavior exhibited strong evidence of non-normality, bivariate correlations with these two variables employed Spearman's ρ rather than Pearson's *r*.

Student Perceptions of the Classroom Teaching Environment

Bivariate correlations between student characteristics and REACT total scores and separate subscale scores appear in Table 23. To adjust for multiple comparisons, a Holm correction was applied to the *p*-values. After adjusting for multiple correlations, five correlations were statistically significant: REACT and class participation ($r = .11$, $p_{adj} < .05$); Classroom Management with achievement, social behavior, and class participation ($r = .12$, $p_{adj} < .05$; $r = .13$, $p_{adj} < .001$; $r = .19$, $p_{adj} < .001$, respectively); and Instructional Presentation and Special Education and accommodation Status ($\rho = -.11$, $p_{adj} < .05$).

Regression results. Results for the models tested for student perceptions of the Classroom Teaching Environment on REACT appear in Table 24. In the final model, only two main effects were significantly associated with student perceptions of the Classroom Teaching Environment as measured by REACT: teacher ratings of classroom social behavior and class participation. The coefficient for classroom social behavior indicated that, on average, for each three points higher a teacher rated a student's social behavior (out of 18), the student rated the Classroom Teaching Environment about one point lower (out of 80) on REACT. The coefficient for class participation indicated that,

on average, for each point higher out of four a teacher rated a student's participation, the student rated the Classroom Teaching Environment two and a half points higher on REACT.

This final model accounted for one percent of the variance in students' ratings of the Classroom Teaching Environment on REACT. Examination of the studentized residuals from this model indicated that the residuals met the assumptions of normality, linearity, and homoscedasticity. Furthermore, the largest proportion of residuals exhibited absolute values of one standard deviation and just two residuals exhibited absolute values greater than three standard deviations.

Student Perceptions of the Classroom Social Environment

Bivariate correlations between student characteristics and CAIRS total scores and separate subscale scores were more robust than those for REACT (see Table 23). To adjust for multiple comparisons, the Holm correction was applied to the *p*-values. As with REACT scores, correlations with gender were not significant. Correlations with Special Education and accommodation status were in the expected negative direction, with significant correlations between Special Education and accommodation status and CAIRS total scores ($r = .16$, $p_{adj} < .001$), Relational Support ($r = .15$, $p_{adj} < .001$), Social Climate ($r = .12$, $p_{adj} < .05$), and Appropriate Challenge ($r = .15$, $p_{adj} < .001$). Total scores on CAIRS and four of the five subscale scores were significantly correlated with achievement, with CAIRS total scores and scores on the Appropriate Challenge subscale demonstrating the strongest correlations ($r = .27$ $p_{adj} < .001$, and $r = .32$, $p_{adj} < .001$, respectively). Total scores on CAIRS and four of the five subscales were significantly

correlated with teacher ratings of classroom social behavior, with CAIRS total scores and scores on the Enjoyment and Social Climate subscales demonstrating the strongest correlations ($r = .22$, $p_{adj} < .001$, $r = .19$, $p_{adj} < .001$, $r = .19$, $p_{adj} < .001$, respectively). Finally, total scores on CAIRS and four of the five subscales were significantly associated with teacher ratings on class participation, with CAIRS total scores and scores on the Appropriate Challenge subscale demonstrating the most robust correlations ($r = .26$, $p_{adj} < .001$ and $r = .22$ $p_{adj} < .001$ respectively).

Regression results. Results of the models tested for student perceptions of the Classroom Social Environment on CAIRS appear in Table 25. Student gender alone did not significantly predict student ratings on CAIRS; however, the authors retained the variable to examine the extent to which interactions between gender and other variables significantly predicted CAIRS scores. In the next model, the interaction of gender and Special Education status significantly predicted CAIRS scores and indicated that, on average, female students served through general education rated the Classroom Social Environment 4.5 points higher (out of 76) on CAIRS than male students served through Special Education or Section 504 accommodations. Following the introduction of the other predictors, however, the interaction of Special Education and accommodation status and gender did not significantly predict CAIRS scores. Gender was then removed as a predictor altogether.

In the final model, three main effects were significantly associated with students' perceptions of the Classroom Social Environment: Special Education and accommodation status, achievement, and class participation. The interaction of Special

Education and accommodation status with classroom social behavior also significantly predicted student perceptions of the Classroom Social Environment. The coefficient for the interaction of educational placement and classroom social behavior indicated that higher ratings of social behavior on SAEBRS for general education students were associated with more positive perceptions of the Classroom Social Environment on CAIRS; however, for students served through Special Education or Section 504 accommodations, the association of teacher ratings on SAEBRS and student ratings on CAIRS ratings was not significant. The coefficient for achievement indicated that, on average, for each point higher a student's grade in the class was out of four, the student rated the Classroom Social Environment one point higher on CAIRS. The coefficient for class participation indicated that for each point higher a teacher rated a student's participation out of four, the student rated the Classroom Social Environment one and a half points higher on CAIRS. This final model accounted for nine percent of the variance in students' ratings of the Classroom Social Environment on CAIRS (see Table 25, Model 7). Examination of the studentized residuals from this model indicated that the residuals met the assumptions of normality, linearity, and homoscedasticity. A plot of the fitted values versus studentized residuals indicated seven cases had residuals with absolute values larger than three. Examination of these cases indicated no justification for removal, and a test of the model with these seven cases removed resulted in only a small increase in the adjusted R-squared value (.008) and no change in the *p*-value for any of the predictors.

Discussion

The purpose of the current study was to examine the extent to which student ratings on REACT and CAIRS were associated with risk factors for student disengagement, specifically, gender, special education and accommodation status, social behavior, and class participation. The authors expected that students who demonstrated these risk factors would report different perceptions of the classroom environment, as measured by REACT and CAIRS. Results provided some evidence that students identified with these risk factors for disengagement endorsed different ratings of the Classroom Teaching Environment on REACT and the Classroom Social Environment on CAIRS, as compared to peers not identified with such risk factors. Specifically, correlational results indicated that students served by special education or Section 504 accommodations, with lower achievement, and lower teacher ratings of classroom behavior and participation were more likely to report lower scores on some subscales of REACT and nearly all subscales on CAIRS. Associations of student ratings on CAIRS with these risk factors were more robust than associations with student ratings on REACT; though, all significant correlations with REACT or CAIRS were small, ranging from $r = .11$ to $r = .32$. Implications are discussed in more detail in Chapter 5.

Chapter 5

The two studies examined modifications to a student rating measure of the classroom environment. Use of student rating data to examine the classroom environment and student experiences requires psychometrically sound measures that attend to relevant aspects of the classroom environment. Furthermore, as classroom experiences have been implicated with student engagement and disengagement, student rating measures that effectively attend to relevant classroom elements may yield data to support students who might otherwise remain or become disengaged. The present studies establish psychometric properties of two student rating scales intended to address two distinct but related aspects of the classroom environment: the Classroom *Teaching* Environment and the Classroom *Social* Environment. The studies further demonstrate the relevance of student responses about the Classroom Social Environment to student engagement and disengagement, which appear to contribute unique information beyond responses about the Classroom Teaching Environment alone.

Study 1: Instrument Development to Assess Additional Classroom Aspects

In Study one the author developed items intended to correspond to unsupportive and unpleasant experiences related to four of the six subscales on REACT, as well as items intended to correspond to students' perceptions of teacher concern and relational support. Analyzing responses from 1160 middle school students in the suburban Upper Midwest indicated that neither items intended to address unpleasant and unsupportive experiences, nor items intended to address social interactions and relational support fit within the factor structure of REACT. Subsequent CFA confirmed that 16 of these items,

along with three items from REACT, fit a hypothesized factor structure that posited five first-order factors, which were all interrelated through the second-order factor called the Classroom Social Environment. Regression analyses then indicated that this new instrument accounted for additional variance in students' engagement and disengagement in class, after controlling for their responses on REACT and their reported grade in the class.

Measurement Model for REACT. Since teachers may use data collected through REACT to inform changes to classroom practice, it is important to continue to establish the validity of REACT as a tool to assess students' perceptions of classroom elements. The cross-validation of the measurement model for REACT on a novel sample lends support to its use to collect data on the classroom, as perceived by students. CFA results indicated poor fit for a model of REACT that included the new items. Thus, items corresponding to unsupportive and unpleasant experiences, as well as items corresponding to student perceptions of social interactions and relational support from the teacher were not sufficiently related to the existing first-order factors in REACT, nor to the second-order factor the Classroom Teaching Environment. Notably, the fact that student responses to items corresponding to social interactions with their teacher and peers did not fit the measurement model of REACT was consistent with theories of the classroom environment, in which social aspects are obliquely related to instructional and organizational aspects (Hamre et al., 2007).

Affective and Social Experiences in Class. CFA results that indicated the fit of a measurement model for items corresponding to social and affective experiences in the

classroom provide preliminary support for the coherence of the hypothesized factors in CAIRS, which are intended to asses students' perceptions of these social and affective classroom elements. CAIRS included three new first-order factors—Relational Support (seven items), Social Climate (five items), and Appropriate Challenge (four items)—as well as a first-order factor previously included within REACT—Enjoyment (three items). These four first-order factors were interrelated through the second-order factor of the Classroom Social Environment. Notably, factor analytic results indicated that three items from REACT corresponded better with CAIRS, which included a factor more closely related to student enjoyment. These results suggest that students' ratings of both instructional and relational aspects of classrooms relate to their responses to items inquiring about their enjoyment of class.

Predicting Engagement and Disengagement. The advent of CAIRS as a complement to REACT provides educators with means to collect data from students about affective and relational aspects of the classroom in addition to instructional aspects. Bivariate correlations indicated support for the hypotheses that the experimental items would account for greater variation in student engagement and disengagement than the 23 item version of REACT alone. CAIRS scores demonstrated moderate to strong correlations with both subtypes of engagement and both subtypes of disengagement. Regression analyses further supported these hypotheses, with CAIRS scores (excluding the three Enjoyment items) significantly predicting changes in both subtypes of engagement and both subtypes of disengagement, after controlling for students' self-reported grade in the class and their scores on REACT.

CAIRS scores demonstrated the strongest associations with emotional engagement and emotional disengagement. These results were consistent with expectations that items intended to address affective and relational components of the classroom would better predict students' emotional engagement in a class, as compared to REACT alone, which contains items intended to correspond to instructional practices. Notably, engagement and disengagement exhibited moderate to strong associations with REACT and CAIRS, despite the fact that CAIRS scores excluded the Enjoyment factor for regression analyses. The strength of the relationship between this truncated form of CAIRS and disengagement is consistent with findings from research with disengaged students who left school early, which indicated that relational interactions with teachers that were unsupportive or marked by conflict contributed to these students' withdrawal from school (Wallace et al., 2012). Consequently, the results of the current study support the use of data on student perceptions of relational support to examine classroom experiences that are salient for students who report disengagement.

Study 2: Risk Factors for Disengagement and Variation in Student Perceptions

In Study two, the author examined differences in student responses to classroom perception items, relative to risk factors for disengagement. Teachers reported students' Gender, Special Education and accommodation status, achievement in class, Social Behavior, and class participation for 744 students. After controlling for multiple comparisons, correlational analyses indicated few statistically significant relationships between student characteristics and students' responses on REACT. Regression analyses indicated that students whose teachers rated them lower in terms of class participation

reported more negative perceptions of the Classroom Teaching Environment; however, these results also indicated that students whose teachers rated them more positively in terms of social behavior reported more negative perceptions of the Classroom Teaching Environment. Furthermore, the final regression model including Social Behavior and class participation accounted for only 1% of the variation in students' ratings of the Classroom Teaching Environment.

Correlational results for CAIRS were more consistent with hypothesized relationships, with significant correlations in the expected directions between students' responses on CAIRS and four of the five student characteristics, including Special Education and accommodation status, class Achievement, Social Behavior, and class participation. Regression analyses indicated that class Achievement, class participation, and the interaction of Social Behavior with Special Education and accommodation status significantly predicted student ratings of the Classroom Social environment on CAIRS and accounted for 9% of the variance in their responses.

Risk Factors and Ratings on REACT. Correlational results provided some evidence that students with different levels of class achievement, classroom social behavior, and participation responded differently to items on REACT, particularly when they responded to REACT items addressing class management. Regression analyses provided some evidence that students identified with risk factors for disengagement responded differently to items on REACT; higher teacher ratings of classroom participation significantly predicted higher student ratings of the Classroom Teaching Environment on REACT. Regression results did not support hypotheses regarding the

association between REACT and other risk factors for disengagement, including Gender, Special Education and accommodation status, class achievement, and classroom social behavior. Classroom social behavior demonstrated an unexpected negative association with REACT scores, suggesting that students who were rated lower in terms of social behavior by their teacher were slightly more likely to endorse more positive perceptions of the Classroom Teaching Environment on REACT. Overall, risk factors for student disengagement accounted for only 1% of the variance in students' ratings of the Classroom Teaching Environment on REACT.

Risk Factors and Ratings on CAIRS. Results provided evidence that students responded differently to CAIRS items relative to Special Education and accommodation status, achievement, classroom social behavior, and participation. Correlation results indicated significant associations between students' responses to CAIRS and their Special Education and accommodation status, class achievement, classroom social behavior, and class participation, as reported by teachers. Regression analyses results indicated that higher grades and class participation were associated with more positive perceptions of the Classroom Social Environment on CAIRS. Regression results also indicated that more positive teacher ratings of classroom social behavior were associated with more positive perceptions of the Classroom Social Environment for students served by general education. However, teacher ratings of classroom social behavior did not significantly predict student ratings of the Classroom Social Environment on CAIRS for students served by Special Education or Section 504 accommodations. Overall, these risk factors

for disengagement accounted for 9% of the variance in students' ratings of the Classroom Social Environment on CAIRS.

Implications for Using Student Rating Data in Classrooms

Student ratings about the Classroom Teaching Environment and Classroom Social Environment were more strongly associated with student-report data regarding their own engagement and disengagement than with data from teachers about student characteristics. These results are consistent with previous research, which has posited components of engagement that are internal and inaccessible to outside observers (Appleton et al., 2006). The results are also consistent with research indicating that student and teacher ratings of classroom experiences demonstrate significant differences (Bernaus & Gardner, 2008; Brekelmans et al., 2011).

Together, the two studies provide insight into how students experience classrooms and how differences in these experiences may associate with reports of engagement and disaffection, as well as different student characteristics. Student ratings of the Classroom Teaching Environment and Classroom Social Environment demonstrated comparable associations with student-reported behavioral and emotional engagement. In terms of behavioral and emotional *dis*engagement, student ratings of the Classroom Social Environment accounted for additional variance, which suggests that attending to social interactions and relational support in the classroom is of relevance for students experiencing disengagement, particularly emotional disengagement. Moreover, student ratings of the Classroom Social Environment on CAIRS demonstrated stronger

associations with student characteristics as reported by teachers than students' ratings of the Classroom Teaching Environment on REACT.

These results further support the perspective that students who are experiencing or at-risk for disengagement are more likely to report more negative perceptions of social interactions and relational support in the classroom. Study two results showed that student rating data exhibited small associations with teacher-reported student characteristics in this sample. These results suggest that student rating data alone may provide insufficient information about classroom elements that are salient for students whom teachers would identify as at-risk for disengagement.

Nonetheless, it is notable that student reports of disengagement exhibited greater variation than teacher reports of social behavior or class achievement. This discrepancy suggests that, even when students perform well academically and are perceived to demonstrate positive social behavior, several may still report feeling disengaged from class. This finding is consistent with previous factor analytic research on engagement and disengagement, which has indicated that the items and factors corresponding to the three subtypes of engagement and disengagement are best modeled through oblique relations, with factors corresponding to distinct but interrelated areas (Appleton et al., 2006; Hart et al., 2012; Skinner et al., 2009). Substantively, these results suggest that students may exhibit behavioral engagement by completing required assignments in a class and following class rules, but still report affective/emotional disengagement, such as feeling bored in class or perceiving negative appraisals from their teacher. Consequently, data on how these students perceive instructional and relational aspects of the classroom can

yield information relevant for addressing internal or private components of disengagement that may not be observable to teachers. Furthermore, to the extent that student-rating data predicted student reports of disengagement suggests the utility of such data for identifying disengagement and addressing it in its early stages, which may be important to prevent further withdrawal from students and to promote engagement before disengagement reaches a critical point.

Implications for Research on Student Rating Data about Classrooms

Previous studies have used interview data to examine classroom experiences associated with disengagement (Cefai & Cooper, 2010; Iachini et al., 2013). The use of student rating data in the current study stands as an innovation that can allow educators to more easily collect data about classroom experiences from a larger group of students across a greater number of settings. Student rating data offers information on how students experience classrooms that allows standardized comparisons, unlike unstructured interview data. In addition, student rating data are far easier to collect than interview data, supporting their use in quick, formative means to inform classroom modifications. Psychometric properties of REACT and CAIRS indicate that these two instruments allow teachers to collect data on students' perceptions of instructional aspects of the classroom as well as relational aspects, both of which are relevant to students' experiences of engagement and disengagement. Nonetheless, the results presented here indicate that additional research still must establish more fully how student ratings may be used to identify which classroom elements may be more salient for certain groups of students.

The findings from the current study have implications for research examining the use of student rating data in classrooms. Overall, the findings provide some support for the collection of student ratings of social and affective aspects of the classroom, in addition to perceptions of instructional aspects, as part of efforts to identify student experiences that seem to be more salient for students at risk for disengagement.

In the current sample, associations were stronger between student risk factors for disengagement and student perceptions of the Classroom Social Environment on CAIRS, as compared to student perceptions of the Classroom Teaching Environment on REACT. Specifically, correlations with CAIRS scores and risk factors were larger and more consistently significant than with REACT scores, and regression models demonstrated a greater proportion of variance explained in CIARS scores than REACT scores. These results are consistent with research on disengaged students who reported that aspects of social interactions with teachers were important factors contributing to the students' withdrawal from school (Davidson, 1999; Wallace et al., 2012).

Furthermore, student responses on REACT were not associated with differences in special education or accommodation status (i.e. general or special education placement). However, student responses on CAIRS were associated with differences in special education or accommodation status, as expected, and indicated that students served through Special Education and Section 504 accommodations tended to report more negative perceptions of affective and relational aspects of the classroom environment. The results provide some indication that students served through special education and accommodations may be at risk to experience less relational support or

perceive more peer conflict in the classroom, regardless of the instructional support they perceive.

Despite the greater consistency in significant associations, however, effect sizes were still small, with significant correlations between student characteristics and CAIRS and subscale scores ranging from .11 to .32. Similarly, in the final model, student characteristics accounted for only 9% of the variance in scores on CAIRS. Thus, while these results point to some value-added for including CAIRS when assessing student ratings of the classroom environment that occasion further investigation, the modest effect sizes limit conclusions about the application of data from CAIRS for addressing interventions that target students with these characteristics .

Novel Data Collection Techniques

The use of the online survey format in the current study allowed students to complete both REACT and CAIRS items in about 15 minutes. The automated online format greatly reduced the administration time of REACT and CAIRS, since previous administrations of REACT alone lasted upwards of 20 to 30 minutes. With the new format, students completed REACT and CAIRS together in about 15 minutes on average. With increasing demands on classroom time, the fact that these modifications to the administration format reduce the time required to administer REACT and CAIRS is expected to support teachers' use of the measures. Furthermore, the current study used an online survey format in which students could listen to recordings of items, as a means to support comprehension for students with difficulty reading in English. This change in administration format is expected to support data collection with students experiencing

difficulties in reading who may benefit from classroom modifications. The reduction in administration time, along with the supports for struggling readers decreases the resources required to collect data through REACT and CAIRS.

Limitations

Several limitations of the current studies bear attention. First, Study 1 is susceptible to mono-operation and mono-method biases, since all measures involved student report. While student rating data is the prevailing collection method for data on emotional engagement and disengagement (Appleton et al., 2006; Skinner, Kindermann, & Furrer, 2009), additional research should include other methods for collecting behavioral engagement data, such as observational and teacher rating data, as well as criteria, such as dropout. In addition, while nearly every student in each of the classed involved completed the measures, the sample was not randomly selected and did not include all classrooms in these two schools. Thus, the results apply only to middle school students in the suburban Upper Midwest. Additional research will need to examine the technical adequacy of CAIRS in other settings. Finally, the correlational methods used do not permit causal claims. Additional research will need to explore whether changes to the classroom dimensions corresponding to REACT and CAIRS items lead to measurable changes in students' engagement and/or disengagement.

Other limitations in the nature of the data collected from teachers for Study 2 appeared implicated in the results of that study. Overall, the results of Study 2 indicated that different student characteristics associated with risk for disengagement are associated with how students perceive the classroom environment, though these effects were weak.

One factor that seems to have contributed to the small effect sizes was the fact that grades and teacher ratings of students' social behavior were very highly skewed, with only 11% of the sample demonstrating grades below a B. Similarly, in terms of classroom social behavior, 86% of the students in the current study were rated above 13—the mean score for sample on which the instrument was initially developed (Kilgus et al., 2013). The limited variance in these two variables constrained the extent to which they might vary with student ratings. Notably, Student perceptions on both CAIRS and REACT demonstrated stronger associations with teacher ratings of class participation, which showed greater variation. The fact that the student sample appeared to be quite high functioning overall in terms of achievement and social behavior indicates that additional research will need to examine the relationship between these risk factors and REACT and CAIRS with a sample that includes a larger portions of students who are struggling academically and behaviorally.

In addition to the nature of the data collected, the collection methods limit the generalizability of these results. Information on student characteristics was collected via indirect ratings from teachers, with recruitment supported by incentives. As a consequence, the results apply only to middle school students in an affluent Upper Midwest suburban setting. Furthermore, administrative data, particularly in terms of student achievement, may have indicated greater variability in student achievement than observed in the current sample, particularly in looking across subject areas.

Finally, in examining differences in student responses relative to Special Education placement or accommodations, Study 2 grouped all students together,

regardless of disability classification. It is quite plausible, however, that students served through different disability categories—for instance, emotional/behavioral disturbance versus specific learning disabilities—would report different experiences in the classroom. Continuing research should employ sampling techniques that more fully represent students in different disability categories.

Conclusion

Despite these limitations, these results highlight the use of student ratings to gather information about classroom elements that are salient for students who disengage from class. In Study 1, two brief student rating scales—REACT and CAIRS—together collected data on students' perceptions of instructional, affective, and relational aspects of the classrooms sampled, and results demonstrated the association of these data with student engagement and disengagement. Continued research is required to establish the technical adequacy of CAIRS in other settings. Study 2 provides some support for the use of student ratings to learn about their experiences related to instructional, affective, and relational aspects of the class environment. The results highlight the need to further examine student rating data that may yield information on classroom elements that are more salient for students with risk factors for disengagement.

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Table 1

Demographic statistics for study one sample

		N	%
N		1160	-
Gender			
	Male	603	52
	Female	557	48
Grade			
	6	452	39
	7	382	33
	8	325	28

Table 2

Demographic statistics for schools sampled

	School A		School B	
	N	%	N	%
American Indian/ Alaskan Native	0	0	1	.1
Asian/Pacific Islander	54	7	123	16
Hispanic	29	4	40	5
Black, non-Hispanic	33	4	70	9
White, non-Hispanic	589	80	514	67
Two or more races	32	4	21	3

Table 3

Shadow matrix of correlations between missingness on individual items

Item ID	Class grade	Year in school	Teacher	Gender
i207	0.00	0.00	0.00	0.00
i615	0.00	0.00	0.00	0.00
i405	0.00	0.00	0.00	0.00
i611	-0.01	0.00	0.00	0.00
i504	-0.01	0.00	0.00	0.00
i307	0.00	0.00	0.00	0.00
i115	-0.01	0.00	0.00	0.00
i205	-0.01	0.00	0.00	0.00
i505	-0.01	0.00	0.00	0.00
i210	-0.01	0.00	0.00	0.00
i506	-0.01	0.00	0.00	0.00
i203	-0.01	0.00	0.00	0.00
i502	-0.01	0.00	0.00	0.00
i404	-0.01	0.00	0.00	0.00
i103	-0.01	0.00	0.00	0.00
i310	-0.01	0.00	0.00	0.00
i109	-0.01	0.00	0.00	0.00
i612	-0.01	0.00	0.00	0.00
i113	-0.01	0.00	0.00	0.00
i206	-0.01	0.00	0.00	0.00
i211	-0.01	0.00	0.00	0.00
i604	-0.01	0.00	0.00	0.00
i212	-0.01	0.00	0.00	0.00
i402	-0.01	0.00	0.00	0.00
i102	-0.01	0.00	0.00	0.00
i110	-0.01	0.00	0.00	0.00
i503	-0.01	-0.01	-0.01	0.00
i607	-0.01	-0.01	-0.01	0.00
i408	-0.01	0.00	0.00	0.00
i306	-0.01	-0.01	-0.01	0.00
i208	-0.01	0.00	0.00	0.00
i609	-0.01	-0.01	-0.01	0.00
i108	-0.01	-0.01	-0.01	0.00
i305	-0.01	-0.01	-0.01	0.00
i613	-0.01	-0.01	-0.01	0.00
i406	-0.01	-0.01	-0.01	0.00
i302	-0.01	-0.01	-0.01	0.00
i202	-0.01	-0.01	-0.01	0.00
i501	-0.01	-0.01	-0.01	0.00

Table 3 continues

Table 3 (continued)

Shadow matrix of correlations between missingness on individual items

Item ID	Class grade	Year in school	Teacher	Gender
i308	-0.01	-0.01	-0.01	0.00
i601	-0.01	-0.01	-0.01	0.00
i101	-0.02	-0.01	-0.01	0.00
i407	-0.01	-0.01	-0.01	0.00
i403	-0.01	-0.01	-0.01	0.00
i209	-0.01	-0.01	-0.01	0.00
i603	0.05	-0.01	-0.01	0.00
i401	-0.01	-0.01	-0.01	0.00
i111	-0.01	-0.01	-0.01	0.00
i112	-0.01	-0.01	-0.01	0.00
i106	-0.01	-0.01	-0.01	0.00
i614	-0.02	-0.01	-0.01	0.00
i107	-0.02	-0.01	-0.01	0.00
i114	-0.02	-0.01	-0.01	0.00
i309	-0.02	-0.01	-0.01	0.00
i303	-0.02	-0.01	-0.01	0.00
i602	-0.02	-0.01	-0.01	0.00
i608	-0.02	-0.01	-0.01	0.00
i301	-0.02	-0.01	-0.01	0.00
be4	-0.02	-0.01	-0.01	0.00
ed2a	-0.02	-0.01	-0.01	0.00
ed5a	-0.02	-0.01	-0.01	0.00
ee1	-0.02	-0.01	-0.01	0.00
be5	-0.02	-0.01	-0.01	0.00
be3	-0.02	-0.01	-0.01	0.00
bd5	-0.02	-0.01	-0.01	-0.01
ed2c	-0.02	-0.01	-0.01	0.17
bd1	-0.02	-0.01	-0.01	0.17
bd4	-0.02	-0.01	-0.01	0.18
bd2	-0.02	-0.01	-0.01	0.18
ed2b	-0.02	-0.01	-0.01	0.18
ee4	-0.02	-0.01	-0.01	0.18
ee3	-0.02	-0.01	-0.01	0.18
ed5d	-0.02	-0.01	-0.01	0.18
ed1c	-0.02	-0.01	-0.01	0.17
ed5b	-0.02	-0.01	-0.01	0.17
ed3	-0.02	-0.01	-0.01	0.16
bd3	-0.02	-0.01	-0.01	0.16
be1	-0.02	-0.01	-0.01	0.17
ed1a	-0.02	-0.01	-0.01	0.17
ee5	-0.02	-0.01	-0.01	0.17

Table 3 continues

Table 3 (continued)

Shadow matrix of correlations between missingness on individual items

Item ID	Class grade	Year in school	Teacher	Gender
ed1b	-0.02	-0.01	-0.01	0.16
ee2	-0.02	-0.01	-0.01	0.17
ed4	-0.02	-0.01	-0.01	0.16
ed5c	-0.02	-0.01	-0.01	0.16
be2	-0.02	-0.01	-0.01	0.15

Table 4

Shadow matrix of correlations between missingness and values on corresponding items

Item ID	Class grade	Year in school	Teacher	Gender
i207	-0.02	-0.01	-0.01	0.00
i615	0.12	0.01	0.01	0.12
i405	0.07	0.04	0.04	-0.01
i611	-0.02	0.01	0.01	0.00
i504	0.08	0.05	0.05	0.13
i307	-0.03	0.00	0.00	-0.03
i115	0.01	0.00	0.00	0.00
i205	-0.04	-0.01	-0.01	-0.04
i505	-0.02	-0.02	-0.02	0.00
i210	0.07	-0.01	-0.01	-0.03
i506	0.00	-0.03	-0.03	-0.04
i203	0.05	0.00	0.00	-0.02
i502	-0.02	0.01	0.01	-0.03
i404	-0.05	0.01	0.01	-0.01
i103	0.00	-0.01	-0.01	-0.01
i310	-0.02	-0.01	-0.01	0.01
i109	0.02	-0.01	-0.01	0.02
i612	-0.01	-0.02	-0.02	-0.02
i113	0.06	0.05	0.05	0.07
i206	0.04	-0.04	-0.04	0.06
i211	-0.03	-0.03	-0.03	0.06
i604	0.01	0.04	0.04	0.05
i212	0.10	0.04	0.04	0.06
i402	0.08	0.01	0.01	-0.02
i102	0.02	-0.01	-0.01	0.01
i110	-0.01	-0.01	-0.01	0.05
i503	0.11	0.01	0.01	0.04
i607	-0.03	0.01	0.01	-0.04
i408	0.04	0.05	0.05	0.01
i306	0.10	0.02	0.02	0.10
i208	-0.03	-0.02	-0.02	0.01
i609	0.10	-0.02	-0.02	-0.04
i108	-0.06	0.04	0.04	-0.03
i305	0.10	-0.02	-0.02	0.11
i613	0.05	0.04	0.04	0.01
i406	-0.01	-0.04	-0.04	0.02
i302	0.05	-0.02	-0.02	0.05
i202	0.06	0.00	0.00	0.00
i501	0.05	0.00	0.00	0.00
i308	-0.02	-0.01	-0.01	-0.04

Table 4 continues

Table 4 (continued)

Shadow matrix of correlations between missingness and values on corresponding items

Item ID	Class grade	Year in school	Teacher	Gender
i601	-0.02	0.04	0.04	0.01
i101	-0.01	0.00	0.00	-0.01
i407	0.04	-0.01	-0.01	0.01
i403	0.04	0.00	0.00	0.00
i209	0.00	-0.04	-0.04	0.05
i603	-0.11	-0.04	-0.04	-0.04
i401	-0.04	-0.03	-0.03	-0.04
i111	0.04	-0.02	-0.02	0.20
i112	0.01	-0.02	-0.02	0.04
i106	0.12	-0.02	-0.02	0.10
i614	0.11	-0.01	-0.01	0.08
i107	0.06	0.02	0.02	-0.02
i114	0.02	-0.01	-0.01	0.04
i309	0.05	0.02	0.02	-0.02
i303	0.06	-0.01	-0.01	0.01
i602	-0.01	-0.01	-0.01	-0.03
i608	0.00	-0.05	-0.05	0.00
i301	0.00	0.01	0.01	0.04
be4	0.08	-0.01	-0.01	0.02
ed2a	0.11	-0.01	-0.01	0.02
ed5a	0.06	0.01	0.01	0.03
ee1	0.04	-0.02	-0.02	-0.04
be5	0.08	-0.03	-0.03	0.01
be3	-0.02	0.01	0.01	0.05
bd5	0.06	0.03	0.03	-0.01
ed2c	0.07	0.02	0.02	N/A
bd1	0.12	0.09	0.09	N/A
bd4	0.07	0.03	0.03	N/A
bd2	0.08	0.01	0.01	N/A
ed2b	0.02	0.01	0.01	N/A
ee4	0.04	-0.02	-0.02	N/A
ee3	0.02	-0.02	-0.02	N/A
ed5d	0.05	0.01	0.01	N/A
ed1c	0.05	0.00	0.00	N/A
ed5b	0.07	0.04	0.04	N/A
ed3	0.07	0.03	0.03	N/A
bd3	0.09	0.03	0.03	N/A
be1	0.06	-0.03	-0.03	N/A
ed1a	0.02	0.00	0.00	N/A
ee5	0.02	0.04	0.04	N/A
ed1b	0.03	0.00	0.00	N/A

Table 4 continues

Table 4 (continued)

Shadow matrix of correlations between missingness and values on corresponding items

Item ID	Class grade	Year in school	Teacher	Gender
ee2	0.03	-0.03	-0.03	N/A
ed4	0.02	0.03	0.03	N/A
ed5c	0.05	0.01	0.01	N/A
be2	0.02	-0.01	-0.01	N/A

Table 5

Descriptive Statistics for REACT Items

							Frequencies			
Factor	Item	*N*	*M*	*SD*	Skew	Kurtosis	Yes	Mostly yes	Mostly no	No
Positive Reinforcement	My teacher recognizes my good behavior.	1156	3.09	.87	-1.20	1.03	36%	43%	15%	6%
	My teacher says nice things about my work.	1154	3.23	.80	-1.21	.79	42%	43%	11%	4%
	My teacher tells me when I do well in class.	1142	3.09	.86	-1.19	.88	37%	42%	14%	6%
Instructional Presentation	My teacher helps me learn ways to answer different kinds of questions.	1143	3.09	.86	-.71	-.16	40%	43%	12%	5%
	We learn tricks, strategies or shortcuts to learn and remember things.	1132	3.28	.77	-1.00	.76	36%	42%	16%	6%
	My teacher keeps me thinking during the lesson.	1140	3.31	.88	-1.25	.83	44%	43%	9%	4%
	My teacher tells me what he/she's going to teach before the lesson begins.	1144	3.2	.74	-.70	.24	52%	33%	7%	7%
	My teacher explains things in more than one way.	1129	3.18	.83	-.87	.28	37%	49%	12%	2%
Goal Setting	My teacher and I set goals for my learning.	1144	2.70	.93	-.29	-.75	23%	35%	27%	16%
	We track how much we learn in class.	1152	2.62	.99	-.18	-.99	21%	36%	27%	16%
	My teacher helps me make plans for how I'll do my work.	1138	2.65	1.00	-.20	-1.02	20%	42%	26%	12%
	My teacher explains why learning is important.	1158	3.07	.86	-.69	-.18	35%	43%	16%	6%

Table 5 continues

Table 5 (continued)

Descriptive Statistics for REACT Items

							Frequencies			
Factor	Item	*N*	*M*	*SD*	Skew	Kurtosis	Yes	Mostly yes	Mostly no	No
Differentiated Instruction	My teacher knows what subjects or skills are easier for me.	1137	2.76	.96	-.40	-.75	23%	42%	21%	13%
	My teacher gives extra review when I need it.	1147	3.21	.84	-.83	-.05	44%	37%	15%	4%
	I have enough time to finish my work.	1140	3.14	.83	-.81	.13	38%	44%	13%	5%
	My teacher helps me pick materials that are on my level.	1150	2.71	.97	-.34	-.83	22%	41%	23%	14%
	There are other learning activities to do when I finish my work early.	1159	3.12	.77	-.65	.17	33%	50%	14%	3%
Formative Feedback	My teacher explains how I am doing in class.	1131	3.27	.81	-.94	.28	19%	37%	29%	16%
	My teacher shows me how to correct my mistakes on my work.	1138	2.59	.97	-.14	-.95	46%	38%	12%	4%
	My teacher comes to check my work when I am working alone.	1137	2.61	.96	-.19	-.90	19%	39%	27%	15%
Instructional Enjoyment	My teacher makes learning enjoyable.	1135	3.31	.82	-1.20	1.03	49%	39%	7%	5%
	My teacher makes class fun.	1148	3.35	.84	-1.21	.79	54%	32%	9%	5%
	I like this class.	1151	3.34	.82	-1.19	.88	52%	35%	9%	5%

Table 6

Item Factor Loadings for REACT

Item	Factor					
	Positive Reinforcement	Instructional Presentation	Goal Setting	Differentiated Instruction	Formative Feedback	Instructional Enjoyment
My teacher recognizes my good behavior.	.65					
My teacher says nice things about my work.	.75					
My teacher tells me when I do well in class.	.68					
My teacher helps me learn ways to answer different kinds of questions.		.69				
We learn tricks, strategies or shortcuts to learn and remember things.		.62				
My teacher keeps me thinking during the lesson.		.67				
My teacher tells me what he/she's going to teach before the lesson begins.		.33				
My teacher explains things in more than one way.		.63				
My teacher and I set goals for my learning.			.65			
We track how much we learn in class.			.38			
My teacher helps me make plans for how I'll do my work.			.61			
My teacher explains why learning is important.			.55			
My teacher knows what subjects or skills are easier for me.				.64		
My teacher gives extra review when I need it.				.58		
I have enough time to finish my work.				.40		
My teacher helps me pick materials that are on my level.				.54		
There are other learning activities to do when I finish my work early.				.32		

Table 6 (continued)

Item Factor Loadings for REACT

	Factor					
	Positive Reinforcement	Instructional Presentation	Goal Setting	Differentiated Instruction	Formative Feedback	Instructional Enjoyment
My teacher explains how I am doing in class.					.63	
My teacher shows me how to correct my mistakes on my work.					.62	
My teacher comes to check my work when I am working alone.					.41	
My teacher makes learning enjoyable.						.91
My teacher makes class fun.						.85
I like this class.						.74

Table 7

REACT First-order Factor Loadings on Classroom Teaching Environment

First-order Factor	Loading on Classroom Teaching Environment
Positive Reinforcement	.86
Instructional Presentation	.93
Goal Setting	.84
Differentiated Instruction	1.00
Formative Feedback	1.01
Instructional Enjoyment	.68

Table 8

Steps for identifying final group of experimental items

Step	Number of items removed
Elimination of items addressing specific instructional practices	10
Elimination of items with skew > 2 and/or kurtosis > 7	5
Elimination of items with item-total correlations < .25	5

Table 9

Descriptive Statistics for CAIRS Items

							Frequencies		
Factor	Item	*N*	*M*	*SD*	Skew	Kurtosis	Yes	Mostly yes	Mostly no	No
Relational Support	I feel nervous asking my teacher for help. (-)	1132	3.42	.84	-1.42	1.25	5%	8%	27%	60%
	My teacher wants me in class.	1145	3.67	.55	-1.76	3.59	71%	26%	2%	1%
	My teacher believes I can do well in this class.	1138	3.72	.50	-1.87	4.15	75%	24%	1%	1%
	My teacher gives me a second chance in class.	1145	3.32	.69	-.85	.82	43%	48%	7%	2%
	If there is a problem, my teacher listens to my side.	1134	3.25	.85	-1.12	.73	46%	40%	8%	6%
	My teacher tries to understand how I feel.	1153	2.84	.90	-.46	-.53	24%	45%	21%	10%
	I get along well with my teacher.	1145	3.69	.55	-1.84	3.96	72%	25%	2%	1%
Social Climate	Other students' behavior disrupts my learning in this class. (-)	1146	2.81	.90	-.54	-.39	11%	18%	49%	22%
	Students use their best behavior in this class.	1160	2.9	.61	-.47	1.03	12%	68%	18%	2%
	My teacher gets upset with the class. (-)	1145	3.11	.69	-.73	1.16	3%	9%	61%	27%
	Students pick on each other without my teacher noticing. (-)	1139	3.28	.82	-1.00	.42	4%	11%	38%	47%
	Students are respectful to each other in class.	1155	3.03	.66	-.54	.95	21%	64%	13%	2%
Appropriate Challenge	Our lessons move too fast. (-)	1143	3.09	.79	-.88	.50	4%	11%	46%	39%
	Homework for this class takes too long. (-)	1139	3.32	.87	-.86	.20	8%	11%	46%	35%
	Lessons are too hard. (-)	1145	2.98	.69	-.96	1.29	2%	6%	50%	42%
	I need more help fixing mistakes on my work. (-)	1150	3.31	.84	-.65	.00	7%	16%	50%	27%
Enjoyment	My teacher makes learning enjoyable.	1135	3.35	.82	-1.20	1.03	49%	39%	7%	5%
	My teacher makes class fun.	1148	3.34	.84	-1.21	.79	54%	32%	9%	5%
	I like this class.	1151	3.42	.82	-1.19	.88	52%	35%	9%	5%

(-) *Indicates reverse-scored item*

Table 10

Bivariate Correlations Between the Final 19 CAIRS Items

Items																	
-																	
.26	-																
.27	.42	-															
.19	.30	.31	-														
.22	.34	.36	.26	-													
.21	.32	.33	.29	.32	-												
.29	.51	.42	.28	.36	.31	-											
.15	.08	.10	.08	.07	.10	.03	-										
.06	.09	.06	.07	.04	.14	.06	.30	-									
.19	.21	.21	.18	.20	.19	.26	.30	.25	-								
.23	.18	.17	.13	.10	.09	.17	.41	.31	.31	-							
.14	.15	.14	.13	.09	.16	.12	.44	.45	.33	.30	-						
.30	.20	.24	.12	.18	.12	.15	.21	.02	.16	.45	.11	-					
.22	.19	.20	.13	.13	.15	.21	.09	.04	.19	.18	.05	.39	-				
.26	.16	.22	.12	.16	.12	.15	.15	-.01	.14	.11	.02	.50	.37	-			
.27	.13	.20	.10	.18	.07	.13	.15	.01	.10	.05	.03	.41	.24	.43	-		
.25	.43	.37	.28	.35	.36	.48	.08	.10	.25	.09	.14	.27	.33	.23	.17	-	
.23	.42	.28	.22	.30	.34	.44	.07	.11	.25	.17	.14	.20	.32	.18	.14	.78	-
.25	.33	.32	.26	.24	.32	.47	.06	.11	.25	.17	.12	.27	.36	.24	.18	.67	.64	-

Table 11

Fit Statistics for Final CAIRS Model and Unidimensional Model

Statistic	Unidimensional	Second-order	Acceptable Values
Degrees of Freedom	152	148	
Absolute Indices			
Chi-Square	2452.83; p <.05	564.556; p <.05	>.05
Standardized Root Mean Square Residual (SRMR)	.10	.05	≤ .08
Parsimonious Fit Indices			
Root Mean Square Error of Approximation (RSMEA)	.11	.05	≤ .05 = Good; ≤ .08 = Acceptable
Incremental Fit Indices			
Comparative Fit Index	.64	.93	≥ .95 = Good
Tucker-Lewis Index	.59	.92	≥ .90 = Acceptable

Table 12

Item Factor Loadings for CAIRS

Item	Factor			
	Relational Support	Social Climate	Appropriate Challenge	Enjoyment
I feel nervous asking my teacher for help. (-)	.43			
My teacher wants me in class.	.67			
My teacher believes I can do well in this class.	.62			
My teacher gives me a second chance in class.	.46			
If there is a problem, my teacher listens to my side.	.54			
My teacher tries to understand how I feel.	.52			
I get along well with my teacher.	.70			
Other students' behavior disrupts my learning in this class. (-)		.60		
Students use their best behavior in this class.		.54		
My teacher gets upset with the class. (-)		.51		
Students pick on each other without my teacher noticing. (-)		.62		
Students are respectful to each other in class.		.71		
Our lessons move too fast. (-)			.72	
Homework for this class takes too long. (-)			.54	
Lessons are too hard. (-)			.70	
I need more help fixing mistakes on my work. (-)			.56	
My teacher makes learning enjoyable.				.90
My teacher makes class fun.				.85
I like this class.				.75

(-) *Indicates reverse scored item*

Table 13

CAIRS First-order Factor Loadings on Classroom Social Environment

First-order Factor	Loading on Classroom Social Environment
Relational Support	.89
Social Climate	.37
Appropriate Challenge	.52
Enjoyment	.80

Table 14

Descriptive Statistics for Outcome and Predictor Variables in Regression Models

	M	*SD*	Min-Max	Skew	Kurtosis
Class Grade	3.74	.51	0-4	-3.29	14.24
Behavioral Engagement	3.32	.45	1-4	-.51	.38
Emotional Engagement	3.14	.55	1-4	-.59	.54
Behavioral Disengagement	1.89	.54	1-4	.63	.58
Emotional Disengagement	1.89	.52	1-4	.62	.67
REACT	69.94	11.2	25-92	-.56	.32
CAIRS	58.55	6.96	32-72	.59	.21

Table 15

Bivariate Correlations Between Predictor Variables and Behavioral Engagement

	Behavioral Engagement	Emotional Engagement	Behavioral Disengagement	Emotional Disengagement	REACT
Class Grade	.21***	.16***	-.21***	-.19***	--
REACT	.41***	.64***	-.39***	-.52***	--
CAIRS	.41***	.65***	-.47***	-.69***	--
CAIRS Short†	.36***	.54***	-.43***	-.64***	.62***

*$p < .05$; **$p < .01$; ***$p < .001$

† The CAIRS measure without the *enjoyment* subscale

Table 16

Behavioral Engagement Standardized Regression Estimates

	Model 1	Model 2	Model 3
Intercept	2.60***	1.71***	1.42***
	(.10)	(.11)	(.14)
Class Grade	.19***	.16***	.14***
	(.03)	(.02)	(.02)
REACT		.39***	.29***
		(.001)	(.001)
CAIRS†			.16***
			(.003)
Adjusted R^2	.04	.19	.20
F	46.72	124.4	91.62
(*df1, df2*)	(1, 1055)	(2, 1054)	(3, 1053)

*$p < .05$; **$p < .01$; ***$p < .001$

†The CAIRS measure without the *enjoyment* subscale

Table 17

Emotional Engagement Standardized Regression Estimates

	Model 1	Model 2	Model 3
Intercept	2.50***	.70***	-.10
	(.12)	(.12)	(.14)
Class Grade	.16***	.07**	.04
	(.03)	(.03)	(.03)
REACT		.64***	.47***
		(.00)	(.001)
CAIRS†			.22***
			(.003)
Adjusted R^2	.02	.42	.45
F	21.75	380.5	286.1
(*df1, df2*)	(1, 1055)	(2, 1054)	(3, 1053)

*$p < .05$; **$p < .01$; ***$p < .001$

†The CAIRS measure without the *enjoyment* subscale

Table 18

Behavioral Disengagement Standardized Regression Estimates

	Model 1	Model 2	Model 3
Intercept	2.69***	3.74***	4.40***
	(.12)	(.14)	(.16)
Class Grade	-.21***	-.16***	-.13***
	(.03)	(.03)	(.03)
REACT		-.37***	-.20***
		(.00)	(.002)
CAIRS			-.29***
			(.003)
Adjusted R^2	.04	.18	.23
F	45.15	113.6	104.2
(*df1, df2*)	(1, 1055)	(2, 1054)	(3, 1053)

*$p < .05$; **$p < .01$; ***$p < .001$

†The CAIRS measure without the *enjoyment* subscale

Table 19

Emotional Disengagement Standardized Regression Estimates

	Model 1	Model 2	Model 3
Intercept	2.60***	3.99***	5.12***
	(.11)	(.12)	(.14)
Class Grade	-.19***	-.13***	-.07**
	(.03)	(.03)	(.02)
REACT		-.50***	-.19***
		(.00)	(.001)
CAIRS			-.51***
			(.003)
Adjusted R^2	.03	.28	.44
F	37.97	207.4	274.8
(*df1, df2*)	(1, 1055)	(2, 1054)	(3, 1053)

*$p < .05$; **$p < .01$; ***$p < .001$

†The CAIRS measure without the *enjoyment* subscale

Table 20

Study 2 Sample Characteristics (N=744)

Subgroup	*N*	%
Female	355	48%
Special Education	52	7%
Section 504 Accommodation	26	3%
Grade		
6	190	26%
7	228	31%
8	272	37%

Table 21

Descriptive Statistics for Student Characteristic Variables

	N	*M*	*SD*	Min-Max	Skew	Kurtosis
Achievement	744	3.6	.62	0-4	-2.02	4.23
Classroom Social Behavior	744	16	2.44	2-18	-1.72	3.69
Class Participation	744	3.03	.59	1-4	-.17	-.26

Table 22

Descriptive Statistics for REACT and CAIRS Total Scores and Subscale Scores

	N	*M*	*SD*	Min-Max	Skew	Kurtosis
REACT†	720	60.00	9.72	27-80	-.01	.36
Class Management	743	9.34	2.01	3-12	-.71	.31
Instructional Presentation	733	16.04	2.80	5-20	-.71	.57
Goal setting	737	11.08	2.53	4-16	-.24	-.35
Formative Feedback	737	8.56	2.00	3-16	-.34	-.25
Differentiation	737	14.96	2.72	7-20	-.41	-.18
CAIRS	721	61.59	7.39	34-76	-.68	.14
Enjoyment	739	9.80	2.25	3-12	-1.12	.77
Relational Support	732	23.89	3.05	10-28	-.90	1.11
Social Climate	737	15.29	2.59	6-20	-.66	.41
Appropriate Challenge	739	12.62	2.37	4-16	-.84	.67

†REACT scores excluded the Enjoyment subscale

Table 23

Bivariate Correlations for REACT and CAIRS Total Scores and Subscale Scores, and Student Characteristics

	Male	Special Education or Section 504	Achievement [a]	Classroom Social Behavior [a]	Class Participation
REACT†	-.05	-.08	.09	.04	.11*
Class Management	-.09	-.06	.12*	.13***	.19***
Instructional Presentation	-.03	-.11*	.10	.03	.09
Goal setting	-.03	-.05	-.05	.03	.03
Formative Feedback	-.02	.01	-.03	-.06	-.01
Differentiation	-.02	-.06	.10	.004	.10
CAIRS	-.04	-.16***	.27***	.22***	.26***
Enjoyment	-.05	-.01	.18***	.19***	.21***
Relational Support	-.06	-.15***	.19***	.15***	.21***
Social Climate	-.02	-.12*	.09	.19***	.10
Appropriate Challenge	.03	-.15***	.32***	.11**	.22***

*$p < .05$; **$p < .01$; ***$p < .001$

†REACT scores excluded the Enjoyment subscale

[a] Correlations with Achievement and SAEBRS scores were Spearman's **ρ**

Table 24

Regression Estimates for REACT Models

	Regression Models						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	59.55***	58.82***	56.63***	58.85***	59.74***	63.96***	58.37***
	(.49)	(1.42)	(2.34)	(2.87)	(2.86)	(5.80)	(2.40)
Female	.90	-2.71	-2.68	-2.52	-2.77	-2.56	
	(.71)	(2.40)	(2.40)	(2.40)	(2.40)	(2.41)	
Gen Ed		.84	.50	.79	.67	-4.38	
		(1.51)	(1.54)	(1.55)	(1.56)	(6.20)	
Female x Gen Ed		3.84	3.70	3.78	3.66	3.39	
		(2.51)	(2.51)	(2.51)	(2.51)	(2.53)	
Achievement			.71	.96	.30	.28	
			(2.34)	(.63)	(.68)	(.69)	
Classroom Social Behavior				-.22	-.45*	-.74	-.38*
				(.16)	(.19)	(.40)	(.19)
Class Participation					2.11*	2.06*	2.56**
					(.87)	(.87)	(.77)
Classroom Social Behavior x Gen Ed						.36	
						(.43)	
Adjusted R^2	<.001	.01	.01	.01	.01	.01	.01

*$p < .05$; **$p < .01$; ***$p < .001$

Table 25

Regression Estimates for CAIRS Models

	Regression Models						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	61.36 ***	59.40***	51.94***	47.83***	47.79***	55.69***	55.41***
	(.37)	(1.06)	(1.72)	(2.17)	(2.08)	(4.19)	(4.19)
Female	.51	-3.43	-3.33	-3.62*	-3.88*	-3.49*	
	(.54)	(1.79)	(1.76)	(1.75)	(1.74)	(1.82)	
Gen Ed		2.24*	1.11	.58	.46	-8.97*	-8.45*
		(1.13)	(1.13)	(1.13)	(1.12)	(4.48)	(4.48)
Female x Gen Ed		4.13*	3.67*	3.52	3.45	2.94	
		(1.89)	(1.85)	(1.83)	(1.82)	(1.83)	
Achievement			2.39***	1.92***	1.33**	1.31**	1.37**
			(.44)	(.46)	(.50)	(.50)	(.50)
Classroom Social Behavior				.41***	.20	-.35	-.39
				(.12)	(.14)	(.29)	(.29)
Class Participation					1.87**	1.77**	1.59*
					(.63)	(.63)	(.62)
Classroom Social Behavior x Gen Ed						.67*	.71*
						(.31)	(.31)
Adjusted R^2	<.001	.03	.06	.08	.09	.09	.09

*$p < .05$; **$p < .01$; ***$p < .001$

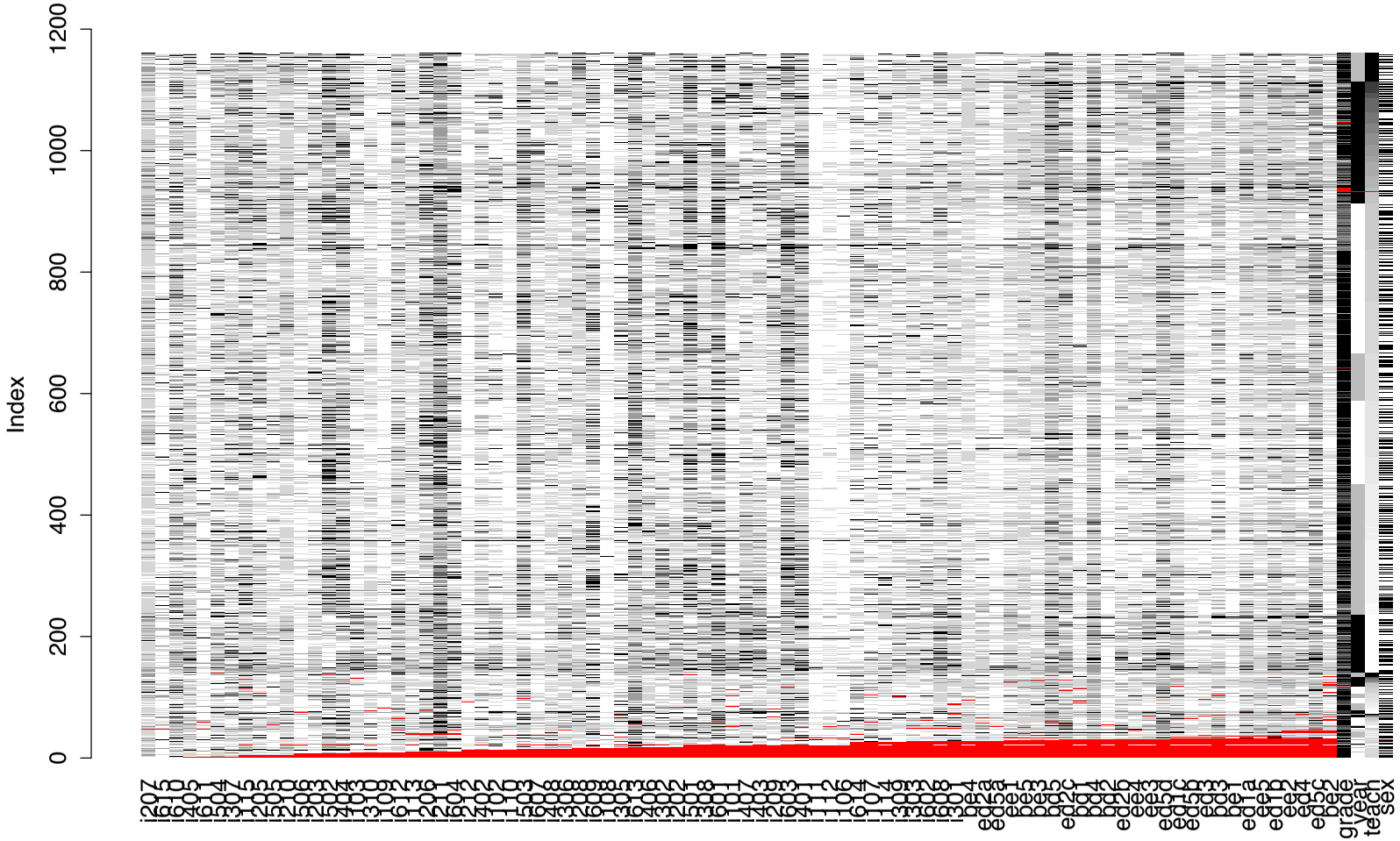

Figure 1. Matrix plot of missing values. *X*-axis shows individual item ID codes and variables for grade, year-in-school, teacher, and gender. Missing responses appear in red. Darker shades of gray indicate larger values on the variable indicated for a given column.

Appendix A: Responsive Environmental Assessment for Classroom Teaching

Classroom Management
My teacher recognizes my good behavior.
My teacher says nice things about my work.
My teacher tells me when I do well in class.
Instructional Presentation
My teacher tells me what he/she's going to teach before the lesson begins.
My teacher explains things in more than one way.
My teacher helps me learn ways to answer different kinds of questions.
We learn tricks, strategies or shortcuts to learn and remember things.
My teacher keeps me thinking during the lesson.
Goal Setting
My teacher and I set goals for my learning.
We track how much we learn in class.
My teacher helps me make plans for how I'll do my work.
My teacher explains why learning is important.
Differentiated Instruction
My teacher knows what subjects or skills are easier for me.
My teacher gives extra review when I need it.
I have enough time to work on new things I learn.
My teacher helps me pick books or materials that are on my level.
There are other learning activities to do when I finish my work early.
Formative Feedback
My teacher explains how I am doing in class.
My teacher shows me how to correct my mistakes on my work.
My teacher comes to check my work when I am working alone.
Instructional Enjoyment
My teacher makes learning enjoyable.
My teacher makes class fun.
I like this class.

Appendix B: Items Added as Part of the Current Study

My learning is disrupted by student behavior in class. (-)

My teacher gets upset with the class. (-)

Students pick on each other without my teacher noticing. (-)

I always have to do things the way my teacher says. (-)

Our lessons move too fast. (-)

It takes a long time to get our work back in class. (-)

Homework for this class takes too long. (-)

My teacher cares more about how well I do on tests than how hard I work. (-)

I am afraid to make mistakes in this class. (-)

I need more help fixing mistakes on my work. (-)

My teacher often compares me to other students. (-)

My teacher tells me he/she is disappointed with my work. (-)

My teacher wants me in this class.

My teacher gives me a second chance in class.

My teacher tries to understand how I feel.

I get along well with my teacher.

My teacher listens to my side of things.

I feel disrespected by my teacher. (-)

If I do something wrong my teacher stays upset at me. (-)

I am nervous asking my teacher for help. (-)

I have a hard time getting along with my teacher. (-)

I trust my teacher.

Appendix C: Measure of Engagement Versus Disaffection, Student Report Form

Please respond to each of the following items on a scale of zero to three, where 0 = "not at all true" and 3 = "very true."

Behavioral Engagement

1. I try hard to do well in school.
2. In class, I work as hard as I can.
3. When I'm in class, I participate in class discussions.
4. I pay attention in class.
5. When I'm in class, I listen very carefully.

Emotional Engagement

1. When I'm in class, I feel good.
2. When we work on something in class, I feel interested.
3. Class is fun.
4. I enjoy learning new things in class.
5. When we work on something in class, I get involved.

Behavioral Disaffection

1. When I'm in class, I just act like I'm working. (-)
2. I don't try very hard at school. (-)
3. In class, I do just enough to get by. (-)
4. When I'm in class, I think about other things. (-)
5. When I'm in class, my mind wanders. (-)

Emotional Disaffection

1. a. When we work on something in class, I feel bored. (-)
   b. When I'm doing work in class, I feel bored. (-)
   c. When my teacher first explains new material, I feel bored. (-)
2. a. When I'm in class, I feel worried. (-)
   b. When we start something new in class, I feel nervous. (-)
   c. When I get stuck on a problem, I feel worried. (-)
3. When we work on something in class, I feel discouraged. (-)
4. Class is not all that fun for me. (-)
5. a. When I'm in class, I feel bad. (-)
   b. When I'm working on my classwork, I feel mad. (-)
   c. When I get stuck on a problem, it really bothers me. (-)
   d. When I can't answer a question, I feel frustrated. (-)

Note. From (Skinner et al., 2009).

Appendix D: Teacher Items

1. Last letter of student's first name (For example, enter "h" if the student's name is "Joseph," even if he goes by "Joe")
2. Student's birth month
3. Enter the student's Participant Number from your list
4. Does this student receive Special Education Services? Yes/No
    a. Under which disability category?
5. Does this student receive accommodations through a Section 504 plan?
6. Has this student been referred for an evaluation for Special Education eligibility? Yes/No

Appendix E: Measure of Engagement Versus Disaffection, Teacher Report

Please respond to each of the following items on a scale of zero to three, where 0 = "not at all true" and 3 = "very true."

Behavioral Engagement

1. In my class this student works as hard as he/she can
2. When working on class work in my class, this student appears involved
3. When I explain new material this student listens carefully
4. In my class this student does more than required
5. When this student doesn't do well, he/she works harder

Behavioral Disaffection

1. When we start something new in class this student thinks about other things
2. In my class this student comes unprepared
3. When faced with a difficult assignment this student doesn't even try
4. In my class this student does just enough to get by
5. When we start something new this student doesn't pay attention

Note. From (Skinner et al., 2009).

Appendix F: Social and Academic Behavior Risk Screener (Social Behavior Scale)

Using the following scale, identify how frequently the student has displayed each of the following behaviors **during the previous month**. Circle only one number for each behavior.

0 = Never, 1 = Sometimes, 2 = Often, 3 = Almost Always

Arguing
Cooperation with peers
Temper outbursts
Disruptive behavior
Polite and socially appropriate responses toward others
Impulsiveness

Note. From (Kilgus et al., 2013)