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Multilevel Associations Between School-Wide Social–Emotional Learning Approach and Student Engagement Across Elementary, Middle, and High Schools

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Abstract. The concurrent associations between students' perceptions of cognitive–behavioral and emotional engagement in schools and three factors aligning with the major aims of the school-wide social–emotional learning (SEL) approach (i.e., teacher–student relationships, student–student relationships, and teaching of social and emotional competencies) were examined among 25,896 students across elementary, middle, and high school while controlling statistically for demographic variables. Results indicated that at the student level all three factors were associated significantly with cognitive–behavioral engagement, but at the school level only the teaching of social and emotional competencies was associated significantly with cognitive–behavioral engagement. All three factors were also associated significantly with emotional engagement at both the student and school levels, with teacher–student relationships having the strongest association. Results of moderating analyses revealed that the strength of association of student engagement with teacher–student relationships, student–student relationships, and the teaching of social–emotional competencies varied depending on the types of engagement and students' grade levels. These and other key findings, as well as implications for research and practice, are discussed.

Student engagement is generally defined as "the quality of a student's connection or involvement with the endeavor of schooling and hence with the people, activities, goals, values, and place that compose it" (Skinner, Kindermann, & Furrer, 2009, p. 494). Empirical studies have demonstrated that student engagement is related to a number of important outcomes, including greater academic participation, achievement, school completion, greater effort in learning activities, a stronger sense of liking toward and connectedness with school, and more positive personal well-being (Estell & Perdue, 2013; Furlong et al., 2003; Janosz, Archambault, Morizot, & Pagani, 2008). Research has also shown that lower student engagement is associatied with a variety of negative outcomes, including delinquency, violence, teen pregnancy, substance abuse, and school dropout (Payne, Gottfredson, & Gottfredson, 2003; Simons-Morton, 2004). Thus, fostering student engagement is a major goal of many universal, school-based programs designed to help promote positive outcomes and reduce risk behaviors (Adelman & Taylor, 2010; Fredricks, Blumenfeld, & Paris, 2004).

Although the positive and essential role of student engagement in youth's learning and development has been widely recognized in the research literature, challenges remain for researchers, educators, and policy makers to better understand what factors might best be targeted in school-wide programs to effectively promote student engagement across multiple domains (Furlong et al., 2003; You & Sharkey, 2009). This is largely due to the complex conceptual and methodological challenges inherent in testing a comprehensive model of student engagement that includes the school-wide factors. To address this research gap, the present study used a multilevel approach to examine how three factors (i.e., teaching of social–emotional competencies, teacher–student relationships, and student–student relationships) are associated with

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student engagement at both the student and school levels. As we will discuss, these three factors align with the major strategies of the school-wide social–emotional learning (SEL) approach.

School-Wide Social–Emotional Learning and Its Association With Student Engagement

SEL has been a focus of research for several decades, but the field still lacks a unifying framework (Jones & Bouffard, 2012). The most popular framework to have emerged is that of the Collaborative for Academic, Social, and Emotional Learning (CASEL). CASEL defined SEL as the "process through which children and adults acquire and effectively apply the knowledge, attitudes, and skills necessary to understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible decisions" (CASEL, 2017). According to CASEL's SEL framework, there are five key interconnected sets of cognitive, affective, and behavioral competencies: self-awareness, self-management, social awareness, relationship skills, and responsible decision making (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011). Those five skill sets are frequently used by school districts and states in developing standards for social–emotional learning (Kress & Elias, 2006). Moreover, researchers who promote SEL in schools have stressed that school-wide SEL approaches are needed in addition to the classroom-based programming in which SEL is taught through full-scale curriculum or adult modeling and embodiment in structured lesson blocks (Oberle, Domitrovich, Meyers, & Weissberg, 2016). Thus, the school-wide approach "defines the entire school community as the unit of change and aims to integrate SEL into daily interactions and practices at multiple setting levels in the school using collaborative efforts that include all staff, teachers, families, and children" (Oberle et al., 2016, p. 278). By creating a supportive context, this systemic approach introduces and maintains effective SEL programming for all students and moves schools away from piecemeal and fragmented approaches of SEL to one that is comprehensive and coordinated in both planning and implementation (Greenberg et al., 2003; Oberle et al., 2016).

Based on the review of a broad range of research evidence, researchers have proposed that effective school-wide SEL programs should include two general key components: the systematic and quality instruction of SEL skills and the establishment of a caring, safe, and cooperative school-wide environment (CASEL, 2005; Devaney, O'Brien, Resnik, Keister, & Weissberg, 2006; Greenberg et al., 2003; Zins, Bloodworth, Weissberg, & Walberg, 2004). The first component emphasizes social and emotional education (or person-centered skill development) through systematic instruction and students' ongoing learning and real-life application of SEL skills. Through teacher instruction, students are provided opportunities to apply these skills to diverse situations and use them as part of their daily repertoire of behaviors. The second component focuses on environmental–organizational change and emphasizes the establishment of a supportive classroom and school-wide climate, and particularly positive relationships in schools. A positive climate provides students with the opportunity to connect with others, to learn and emulate behaviors they come to value, and to interact socially to further learn, practice, and refine SEL skills (Catalano, Haggerty, Oesterle, Fleming, & Hawkins, 2004).

Although these two general strategies of the school-wide SEL approach are considered grounded in research on how students' SEL skills develop and how program implementation works, empirical studies supporting their application are lacking (Jones & Bouffard, 2012). To address this gap, the present study focused on three key factors that are related to the components of the school-wide SEL approach and examined their concurrent associations with student engagement at both student and school levels and across elementary, middle, and high school. The first factor (i.e., teaching of social–emotional evidence) relates to the instruction of social–emotional skills, whereas the other two factors (i.e., teacher–student and student–student relationships) relate more to establishing a caring and safe learning environment. Existing research supporting the associations between each of these three factors and student engagement are reviewed briefly, including any grade level differences.

Teaching of Social and Emotional Competencies

Empirical studies directly examining the association between the teaching of social and emotional competencies and student engagement are scarce. However, the link between the teaching of social and emotional competencies and student engagement has been indicated in studies examining the educational impact of SEL intervention programs. For example, in a meta-analysis of 213 school-based, universal SEL studies including 270,034 kindergarten through high school students, Durlak et al. (2011) found that SEL interventions significantly improved students' attachment and attitudes toward school, leading to better social attendance, higher motivation, and higher morale. Results of another meta-analysis (Korpershoek, Harms, de Boer, van Kuijk, & Doolaard, 2016), which included 54 random and nonrandom controlled intervention studies in elementary schools, found that intervention strategies focusing on students' social–emotional development demonstrated significant and stronger effectiveness in enhancing students' academic, behavioral, and social–emotional outcomes compared to other intervention strategies focusing on teacher and student behavior. In the studies included in these two meta-analyses, typically the teaching of social and emotional competencies was either part of a sequenced SEL curriculum or integrated throughout the general curriculum. The unique contribution of social–emotional competencies, the teaching of which is a common element or strategy of the school-wide SEL approach, to student engagement outcomes has never been directly examined.

Existing research also recognizes that teacher instruction plays a central role in maximizing students' motivation and engagement (Skinner & Belmont, 1993). However, more studies have focused on academic instruction than nonacademic instruction, including teaching social–emotional skills. A few studies have shown that teachers' comfort and commitment in the teaching of social and emotional skills are related to students' behavioral and emotional difficulties, as well as to teachers' stress, job satisfaction, and teaching efficacy (Collie, Shapka, & Perry, 2012; Poulou, 2017). However, we know of no studies that have examined the influence of teaching social and emotional competencies, as perceived by students, on student engagement. The perceptions of students are important given that students are active agents in the process of social and emotional learning. To address these limitations, the present study focused on students' perceptions of the teaching of social and emotional competencies as one of three key factors related to the school-wide SEL approach and examined its association with student engagement at both the student and school levels and across elementary, middle, and high school levels.

Teacher–Student Relationships

Ample studies have supported the notion that teachers' positive relationships and interactions with students play important roles in fostering student engagement (Roorda, Jak, Zee, Oort, & Koomen, 2017; Roorda, Koomen, Spilt, & Oort, 2011; Skinner & Pitzer, 2012; Woolley & Bowen, 2007). The salient impact of teacher–student relationships on student engagement is supported by a number of modern developmental theories, including attachment (Bowlby, 1982), social–cognitive, and self-efficacy theories (Bandura, 1986; Ryan, Stiller, & Lynch, 1994). According to the attachment theory, positive teacher–student relationships closely mirror parent–child relationships, enable students to feel safe and secure in their learning environment, provide students with support to cope with demands in the schools, and provide scaffolding for important social and academic skills (Kremer, 2010). According to the social–cognitive and self-efficacy theories, students' perceptions of their relationships with teachers have a significant impact on their interest in school and their self-efficacy, which in turn promote their behavioral and emotional engagement in school (Ryan et al., 1994). Although the positive influence of teacher–student relationships on student engagement is generally supported by theories, findings are mixed on the strength of the association between teacher–student relationships and student engagement across grade levels. For example, several studies have reported a stronger relationship among younger students and that students are less emotionally connected to teachers and more strongly oriented toward peers when they transition to middle school (Buhrmester & Furman, 1987; Hargreaves, 2000). In contrast, results of a recent meta-analysis of 99 studies, which included students from preschool to high school, suggested a developmental shift in the association between teacher–student relationships and student engagement, with effects being strongest in the higher grades (Roorda et al., 2011).

Student–Student Relationships

Relative to the number of studies focusing on the influence of adults on student engagement, far fewer studies have examined the potential role of peers (Gest, Rulison, Davidson, & Welsh, 2008). This is true despite the fact that multiple theories have long held that peer relationships are a crucial arena in which students observe and influence each other's attitudes, skills, and behaviors, including engagement in school (Rubin, Bukowski, Parker, & Bowker, 2008). For example, according to the self-determination theory, for children to become motivated and engaged in school, their basic psychological needs for relatedness, competence, and autonomy must be fulfilled, which largely occurs in the context of positive relationships with peers and adults (Deci, Vallerand, Pelletier, & Ryan, 1991). According to social control theory, when students feel they are more attached to their fellow students, they are more likely to subscribe to the academic behaviors and attitudes that their school community advocates (Lynch, Lerner, & Leventhal, 2013). From a developmental perspective, peer relationships are not fixed, and they evolve and change over time (Rubin et al., 2008). Thus, it is understood that the association between student–student relationships and student engagement likely changes with the growth of students and the shifting of peer dynamics across different grade levels. To date, very few empirical studies have examined grade or grade-level differences in the association between peer relationships and student engagement. For example, Ryan and Patrick (2001) found that students' perceptions of the social environment in seventh-grade classrooms predicted changes in student motivation and engagement during their transition into eighth grade. Another longitudinal study by Li, Lynch, Kalvin, Liu, and Lerner (2011) found that the effects of supportive peer relationships on student engagement increased from sixth to eighth grade. Based on 1,718 fifth graders from 30 schools, Lynch et al. (2013) found that both the relational and behavioral aspects of peer culture were related to student engagement after controlling statistically for a variety of individual, familial, peer, and school characteristics. All of these studies focused on a narrow span of ages and grade levels, and we know of no studies that have examined the association between peer relationships and student engagement across elementary, middle, and high school.

Social–Ecological Theory

Although the teaching of social and emotional competencies, teacher–student relationships, and student–student relationships are conceptualized as interrelated key factors that align with the school-wide SEL approach, we know of no studies that have examined their concurrent associations with student engagement across elementary, middle, and high school. The concurrent examination of these three factors is consistent with not only the conceptualization of the

school-wide SEL approach, but also the social–ecological framework, which conceptualizes that complex social ecologies, like schools, are multifaceted systems that contains multiple subsystems working together to shape student development. According to the social–ecological framework, teacher–student relationships, student–student relationships, and the teaching of social and emotional competencies represent different subsystems. It is important to examine them jointly because they may exert cumulative or additive influence, in which each may provide essential influence that the others cannot, despite some overlap (Vollet, Kindermann, & Skinner, 2017). Social–ecological theory also views student engagement as a multilevel construct that is influenced by ongoing and reciprocal interactions between individuals and the different layers of the school context (Bronfenbrenner, 1986; Sampson & Laub, 1993). Moreover, we argue that the school-wide SEL approach is also a multilevel process because the implementation of social–emotional learning throughout the school is most likely impacted by both individual features of students and the organizational features of the school. In addition to concurrent examination of factors, the social–ecological perspective also calls for a broader ecological perspective to enhance our understanding of the multilevel effects of universal and school-based SEL programs (Durlak et al., 2011). However, we know of no studies that have examined both the student- and school-level associations of student engagement with the three strategies that are emphasized in the school-wide SEL approach. In response to these research gaps, the present study conducted a concurrent and multilevel examination of the associations between the three factors and engagement to determine, using the same measures, the extent to which student engagement is related to each of these three factors at both student and school levels and across grade levels.

Influence of Demographic Factors on Student Engagement

Although not the main focus of the present study, we also examined the main effects of several student-level and school-level demographic factors on student engagement to take the ecological influence of demographic factors into consideration. Those factors were the students' gender and race/ethnicity, their schools' enrollment, and the socioeconomic status and racial diversity of the schools' enrollment. The ecological influence of these demographic factors was controlled when the multilevel associations of student engagement with the teaching of social and emotional competencies, teacher–student relationships, and student–student relationships were examined. Existing studies supporting these demographic factors' associations with student engagement are briefly reviewed in the following sections.

Students' Gender and Race/Ethnicity

With respect to gender differences, findings have been mixed, with some studies reporting that girls are more engaged than boys, regardless of type of engagement (Johnson, Crosnoe, & Elder, 2001; Marks, 2000) and others reporting that girls' higher levels were found in behavioral and emotional engagement but not cognitive engagement (Wang, Willett, & Eccles, 2011). Studies of race/ethnicity also have yielded mixed findings, with results often dependent on the type of engagement assessed (Bingham & Okagaki, 2012; Johnson et al., 2001; Wang et al., 2011). Results regarding age/grade-level differences in student engagment also have been mixed (Marks, 2000; Perry, Liu, & Pabian, 2010; Wang & Eccles, 2012). For example, in a recent longitudinal study of secondary students, the average growth trajectories for student engagement (i.e., behavioral and emotional engagement) decreased from 7th to 11th grade (Wang & Eccles, 2012). In contrast, in a study of diverse urban youth, the results revealed no significant grade-level differences in behavioral and emotional engagement (Perry et al., 2010).

School-Level Demographic Factors

Primary among school-level factors shown to influence student engagement are the socioeconomic status of the student body, school size, and the racial/ethnic diversity of the student body (Johnson et al., 2001; Li & Lerner, 2011; Weiss, Carolan, & Baker-Smith, 2010). Studies have tended to find that greater student engagement is associated with higher socioeconomic status, both of individual students and the student body (Johnson et al., 2001; Li & Lerner, 2011), and with smaller school size (Weiss et al., 2010). Very few studies have examined the effects of the ethnic composition of the student body on student engagement. An exception was a national longitudinal study by Johnson et al. (2001), which found greater school attachment (similar to emotional engagement) but no differences in behavioral engagement when students attended schools with proportionately more students of their own race/ethnicity.

Purpose of the Study

In summary, consistent with CASEL's SEL framework and the social–ecological theoretical framework, the present study focused on examining (a) the student- and school-level main effects of students' perceptions of teacher–student relationships, student–student relationships, and the teaching of social and emotional competencies on student engagement and (b) differences in the multilevel associations between these three factors and student engagement across three grade levels (i.e., elementary, middle, and high school). The main effects of student demographic factors (i.e., gender and race/ethnicity) and schools (i.e., grade levels, racial/ethnic diversity, social–economic background of student population, and school size) on student engagement were also examined in the context of controlling statistically for the influence of demographic factors. In addition, student engagement was studied as two separate outcomes: emotional engagement and cognitive–behavioral engagement, given that the effect of social–emotional learning on student

engagement might vary depending on the specific types of engagement studied.

METHODS

The present study consisted of 25,896 students (grades 4–12) from 114 U.S. public schools in Delaware: 9,659 students from 71 elementary schools, 9,535 students from 26 middle schools, and 6,702 students from 17 high schools. Students' demographic information (i.e., gender, race/ethnicity, and grade) was collected from the Delaware School Climate Survey–Student (Bear et al., 2014). Schools' demographic information was provided by the Delaware Department of Education (DDOE). It included the number of students enrolled (school size), grade level (elementary, middle, high school), the percentage of students eligible for receiving free or reduced-price meals (FRPM), and the racial/ethnic diversity index of the student body. The demographic information and descriptive statistics of participating students and schools are presented in Table 1.

Procedures

All public schools in Delaware were invited by the DDOE to participate in an annual survey consisting of measures related to school climate. Participation was voluntary. As an incentive for participation, each school was provided a comprehensive report of its scores. To ensure a sufficient sample size per school, elementary schools were asked to survey 100% of students in Grade 3 and above, whereas middle and high schools were asked to survey 100% of their students if the enrollment was less than 300 and 50% if enrollment was greater than 300. Schools were asked to select students randomly for participation and were provided with guidance on how to do so. All surveys were given between late February and late April in 2014. Students completed the surveys in either their classrooms or a school computer lab, with their teachers or other school staff administering the survey. Teachers/staff were provided with a script to read to students before completing the survey, which included assuring students of confidentiality (neither names nor identification numbers were used).

Table 1. Student and School Information

	Elementary	Middle	High	Total
Demographic information–Students: *n* (Percentage)				
Sample size	9,659 (37.30%)	9,535 (36.82%)	6,702 (25.88%)	25,896 (100.00%)
Gender				
Male	4,718 (37.53%)	4,738 (37.69%)	3,114 (24.77%)	12,570 (49.00%)
Female	4,941 (37.08%)	4,797 (36.00%)	3,588 (26.92%)	13,326 (51.00%)
Race/ethnicity				
Caucasian	4,538 (38.59%)	4,304 (36.60%)	2,919 (24.82%)	11,761 (45.42%)
African American	2,216 (34.80%)	2,296 (36.06%)	1,856 (29.15%)	6,368 (24.59%)
Hispanic/Latino	1,511 (40.06%)	1,343 (35.60%)	918 (24.34%)	3,772 (14.57%)
Asian	350 (38.04%)	335 (36.41%)	235 (25.54%)	920 (3.55%)
Other race/ethnicity	1,044 (33.95%)	1,257 (40.88%)	774 (25.17%)	3,075 (11.87%)
Nondemographic information reported by students: Mean (Standard Deviation)				
Teaching of social and emotional competencies	2.89 (0.63)	3.23 (0.56)	2.81 (0.58)	2.54 (0.55)
Teacher–student relationships	3.12 (0.65)	3.48 (0.55)	3.01 (0.62)	2.75 (0.55)
Student–student relationships	2.64 (0.66)	2.85 (0.69)	2.57 (0.62)	2.45 (0.59)
Cognitive–behavioral engagement	3.49 (0.47)	3.23 (0.54)	3.09 (0.52)	3.29 (0.53)
Emotional engagement	3.30 (0.65)	2.86 (0.69)	2.64 (0.65)	2.96 (0.72)
Demographic information–Schools				
Average size of school simple	71	26	17	114
% FRPM	60.07%	55.47%	53.62%	56.39%
Racial/ethnic diversity index	0.56	0.56	0.59	0.58
Average school size	540	767	1,106	804

Note. FRPM = percentage of students receiving free or reduced-price meals. The racial/ethnic diversity index refers to the probability that the next person you encounter is a different race/ethnicity from the one that was just seen (Coulter, 1989).

Teachers/staff were also encouraged to read survey items aloud in classes at the lower grade levels (e.g., Grades 3 and 4) if any students read below the third-grade level. To protect teachers from identification, no method was used to identify teachers or classrooms. Each school's survey response rates ranged from 15.66% to 98.82% (mean = 62.32%, median = 73.03%, average number of respondents in each school = 229). Missing responses to individual survey items ranged from 0.1% to 1.2%. Missing responses to composite scores ranged from 1.2% to 4.4%. All measures and procedures were approved by the DDOE and the institutional review board of the researchers' universities.

Measures

As described herein, students completed the Delaware Student Engagement Scale–Student (DSES-S), the Teaching of Social and Emotional Competencies (TSEC) subscale of the Delaware Techniques Scale–Student (DTS-S), and the Teacher–Student Relationships and Student–Student Relationships subscales of the 2014 version of the Delaware School Climate Scale–Student (DSCS-S-2014; Bear, Gaskins, Blank, & Chen 2011; Bear et al., 2014). Results of confirmatory factor analysis supported these scales' reliability and validity. Moreover, their configural, weak, and strong factorial invariance was also found across grade levels (elementary, middle, and high school), gender, and racial/ethnic groups (i.e., Caucasian, African American, Hispanic/Latino, Asian, and other race/ethnicity including multirace/multiethnicity; Bear et al., 2014).

Student Engagement

Researchers have come to the consensus that student engagement includes at least two components: behavioral and emotional engagement (Li et al., 2011). Behavioral engagement refers to academic involvement and participation in the learning activities in the classrooms; emotional engagement refers to the affective attitudes to classmates, teachers, and school. Some scholars have suggested that cognitive engagement, which is defined as a strategic investment in learning, represents a third component or a distinct subcomponent of behavioral engagement (Fredricks et al., 2004; Hoglund & Leadbeater, 2007). Despite the occasional differentiation of cognitive components of engagement, consensus on including cognitive engagement as one of the essential components of student engagement has not yet emerged (Li et al., 2011). Therefore, in the current study, student engagement is considered a two-dimensional construct including emotional and cognitive–behavioral engagement.

To assess those two dimensions, we used the DSES-S, which consists of 10 items about students' perceptions of their overall experience of being involved, committed, or invested in cognitive–behavioral and emotional aspects of schooling (Bear et al., 2014). Confirmatory factor analysis revealed that the scale is best represented by a two-factor correlation model with two specific factors of cognitive–behavioral engagement and emotional engagement, $\chi^2 = 1524.32$ (26, $N = 25{,}896$), $p < .001$; CFI = .987, RMSEA = .047, and SRMR = .040. Using a 4-point Likert scale (1 = *Disagree a Lot,* 2 = *Disagree,* 3 = *Agree,* and 4 = *Agree a Lot*), students were asked to respond to 10 statements about their schools, such as "I turn in my homework on time" on the Cognitive–Behavioral Engagement subscale and "I like students who go to this school" on the Emotional Engagement subscale. Higher scores reflect greater cognitive–behavioral or emotional engagement. Reliability coefficients for composite scores on the Cognitive–Behavioral Engagement subscale were .85 for all students combined, .82 for elementary school students, .85 for middle school students, and .84 for high school students. In the current study, reliability coefficients for composite scores on the Emotional Engagement subscale were .87 for all students combined, .87 for elementary school students, .87 for middle school students, and .85 for high school students.

Teaching of Social and Emotional Competencies

The five-item TSEC subscale measures students' perceptions of the use of instructional techniques by teachers and school staff to encourage students to feel responsible for and in control of their behavior, consider others' perspectives, feel empathy, and resolve conflicts, thereby promoting social–emotional development, moral reasoning, and self-discipline (Bear et al., 2014). The content of these items is aligned with CASEL's five social and emotional competencies. Using a 4-point Likert scale (1 = *Disagree a Lot,* 2 = *Disagree,* 3 = *Agree,* and 4 = *Agree a Lot*), students were asked how much they agree with five statements about their schools, such as "Students are taught to understand how others think and feel" and "Students are taught how to solve conflicts with others." Higher ratings on the TSEC subscale reflect more teaching of social and emotional competencies in the school. In the current study, scores on the five-item TSEC subscale were found to have reliability coefficients of .86 for all students combined, .81 for elementary school students, .84 for middle school students, and .84 for high school students.

Teacher–Student Relationships and Student–Student Relationships

The four-item Teacher–Student Relationships (TS) subscale of the DSCS-S-2014 assesses students' perceptions of the quality of interactions between adults and students in the school, such as teachers caring about and listening to their students; the four-item Student–Student Relationships (SS) subscale taps students' perceptions of the quality of interactions among students, such as peers showing friendliness, caring, and respect (Bear et al., 2011, 2014). Using a 4-point Likert scale (1 = *Disagree a Lot,* 2 = *Disagree,* 3 = *Agree,* and 4 = *Agree a Lot*), students were asked how much they agree with statements about their schools, such as "Teachers listen to students when they have problems" for the TS subscale and "Students are friendly with each other" for the SS subscale. DSCS-S-2014 is best represented by an eight-factor correlation model. The eight factors are teacher–student

relationships, student–student relationships, school safety, fairness of school rules, clarity of expectations, respect for diversity, school-wide engagement, and school-wide bullying. In the current study, scores on both the TS and SS subscales had a reliability coefficient of .86 for all students combined; .80 and .86, respectively, for elementary school students; .85 for middle school students; and .83 and .84, respectively, for high school students.

Statistical Analyses

The statistical analyses were conducted in three stages: (a) computation of student- and school-level variables and interaction terms based on student-reported survey data, (b) correlation analyses, and (c) multilevel analysis in Statistics Program HLM 7.0.

In the first stage, group-mean centering and school-level aggregation were used respectively to compute student-reported scale scores of TSEC, TS, and SS into two components by taking into consideration the cluster effects of schools. The within-school component (i.e., $TS_{\text{student level}}$, $SS_{\text{student level}}$, $TSEC_{\text{student level}}$) represents individual students' personal perceptions and the between-schools component (i.e., $TS_{\text{school level}}$, $SS_{\text{school level}}$, $TSEC_{\text{school level}}$) represents students' shared perceptions of school-wide variables. Considering that the intraclass correlations (ICC) for TS, SS, and TSEC are relatively high (e.g., >.20) and the range of school size and the number of schools are large, using aggregated school means as school-level predictors is considered minimally biased (Lüdtke et al., 2008). Grand mean centering was applied to all the school-level predictors. The main purpose of the centering procedure on independent variables is to minimize the threat of multicollinearity and to facilitate interpretation (Raudenbush & Bryk, 2002). Grand mean centering was also applied to the dependent variables of cognitive–behavioral engagement and emotional engagement. The purpose of doing so is to conduct a natural standardization on the coefficients of main and moderating effects so that the coefficient estimates for moderating effects could also serve as the effect size to measure the relative magnitude of the main and moderating effects (Dong, Kelcey, Spybrook, & Bulus, 2018).

Following the aggregation and centering procedures, $TSEC_{\text{school level}}$, $TS_{\text{school level}}$, and $SS_{\text{school level}}$ were multiplied by two dummy-coded variables representing grade level (i.e., GradeLevel_D1 and GradeLevel_D2) to generate six school-level interaction terms: $TSEC_{\text{school level}} \times$ GradeLevel_D1, $TS_{\text{school level}} \times$ GradeLevel_D1, $SS_{\text{school level}} \times$ GradeLevel_D1, $TSEC_{\text{school level}} \times$ GradeLevel_D2, $TS_{\text{school level}} \times$ GradeLevel_D2, $SS_{\text{school level}} \times$ GradeLevel_D2).

In the second stage, three sets of correlation analyses were conducted among student-reported scores, the computed student-level scores, and school-level scores, using SPSS Statistics 22 to obtain a preliminary understanding of the relationships between student-level and school-level variables.

In the third stage, two sets of univariate hierarchical linear regression models were sequentially specified and estimated in HLM 7.0 to examine the multilevel main effects and moderating effects, with emotional engagement and cognitive–behavioral engagement as two separate outcomes. For each set of models, an unconditional model (Model 1) with one outcome variable and no predictors was first specified to estimate the ICC. The ICC was used to represent the proportion of variance explained on student engagement at both the student and school levels and to determine if multilevel analysis was appropriate.

In Model 2, demographic factors were added as predictors at the student level and school level simultaneously to examine the concurrent student and school demographic effects on student engagement. In Models 3–8, with the control of demographic effects, six predictors ($TS_{\text{student level}}$, $SS_{\text{student level}}$, $TSEC_{\text{student level}}$, $TS_{\text{school level}}$, $SS_{\text{school level}}$, $TSEC_{\text{school level}}$) were added sequentially, with one added in each model, to examine their unique contributions to the variance in student engagement. The percentage of variance in student engagement explained by the addition of each predictor[1] at the student and school levels was examined in each model to determine if each of the six factors accounted for variance beyond what can be explained by previous predictors and the demographic variables. In Model 9, the six school-level moderation terms prepared previously were added as school level predictors, and the two dummy-coded variables of grade level were added as predictors to the student-level regression slope between each of the three student-level factors and student engagement. The purpose of doing so was to examine the grade-level differences in student engagement's association with the three factors at both student and school levels. The standardized coefficients, standard error, *t* ratio, and *p* value estimated in Model 9 were used to examine the magnitude and practical importance of the main effects and moderating effects. The moderating effects of grade level were also plotted using the Model Graph function within HLM. When the nine models were estimated in HLM 7.0, listwise deletion was performed for missing data based on the variables included in the models.

RESULTS

The means and standard deviations of the four nondemographic variables based on students' survey reports are shown in Table 1. Correlational analyses show that the student-reported scores of TS correlated significantly with SS ($r = .53$) and TSEC ($r = .63$); SS also correlated significantly with TSEC ($r = .52$). TSEC, TS, and SS had stronger significant correlations with emotional engagement (EE; *r*s = .57, .63, and .55,

[1]When the proportion of variance explained was calculated, the previous model (i.e., the model specified in the previous hierarchical step before the new predictors were added), not the null model, was chosen as the comparison model: Proportion of Variance Explained at Student Level by the Addition of Predictor(s) = $(\sigma^2_{\text{previous model}} - \sigma^2_{\text{current model}})/\sigma^2_{\text{previous model}}$; Proportion of Variance Explained at School Level by the Addition of Predictor(s) = $(\tau^{00}_{\text{previous model}} - \tau^{00}_{\text{current model}})/\tau^{00}_{\text{previous model}}$.

respectively) than cognitive–behavioral engagement (CBE; *r*s = .35, .42, and .31, respectively).

When the correlations among student-level and school-level variables were examined separately, $TS_{student\ level}$ correlated significantly with $SS_{student\ level}$ (r = .47) and $TSEC_{student\ level}$ (r = .52); $SS_{student\ level}$ also correlated significantly with $TSEC_{student\ level}$ (r = .46). $TSEC_{student\ level}$, $TS_{student\ level}$, and $SS_{student\ level}$ had stronger significant correlation with $EE_{student\ level}$ (*r*s = .47, .55, and .49, respectively) and $CBE_{student\ level}$ (*r*s = .25, .33, and .24, respectively).

Coefficients were higher at the school level, with $TS_{school\ level}$, $SS_{school\ level}$, $TSEC_{school\ level}$, and school size correlating significantly and respectively with students' perceptions of $CBE_{school\ level}$ (*r*s = .94, .74, .93, and –.55, respectively) and $EE_{school\ level}$ (*r*s = .97, .84, .95, and –.05, respectively). FRPM correlated significantly with $TS_{school\ level}$ and school size only; racial/ethnic diversity index did not significantly correlate with any of the other school-level variables. $TS_{school\ level}$ correlated significantly with $SS_{school\ level}$ (r = .79) and $TSEC_{school\ level}$ (r = .98); $SS_{school\ level}$ also correlated significantly with $TSEC_{school\ level}$ (r = .76).

Results of HLM Analyses

A hierarchical linear regression modeling framework was employed in the current study to answer the research questions.

ICC and School Effects

Model 1 of the HLM analyses revealed an ICC value of .111 for cognitive–behavioral engagement and .182 for emotional engagement, indicating that 11.1% and 18.2% of the variance in students' perceptions of cognitive–behavioral and emotional engagement could be explained by factors at the school level, leaving 89.9% and 81.9% accounted for at the student level. Results of Model 1 also showed that significant variances in both cognitive–behavioral and emotional engagement were explained by school groupings, χ^2 (113) = 3,527.15, $p < .001$ for cognitive–behavioral engagement and χ^2 (113) = 5,923.23, $p < .001$ for emotional engagement, supporting the use of multilevel analyses (Lee et al., 1998).

Main Effects of Demographic Factors

When the student and school demographic factors were added as predictors in Model 2, perceived student engagement scores were significantly different between males and females ($b = 0.11$, $t = 17.29$, $p < .001$ for cognitive–behavioral engagement and $b = –0.02$, $t = –2.70$, $p < .01$ for emotional engagement). More specifically, female students reported higher cognitive–behavioral engagement than male students, whereas male students reported higher emotional engagement than female students.

With respect to race/ethnicity, African American students had significantly lower scores on cognitive–behavioral engagement than Hispanic/Latino students ($b = 0.10$, $t = 10.61$, $p < .001$) and Asian students ($b = 0.22$, $t = 11.61$, $p < .001$). African American students did not have significantly different scores from Caucasian students and students with multiracial backgrounds. Among all the racial/ethnic groups, Asian students perceived student cognitive–behavioral engagement most favorably. African American students had significantly higher emotional engagement scores than students with multiracial backgrounds ($b = –0.08$, $t = –5.51$, $p < .001$) and significantly lower scores than Caucasian students ($b = 0$ .09, $t = 5.65$, $p < .001$) and Asian students ($b = 0.15$, $t = 6.13$, $p < .001$). There was no significant difference in emotional engagement scores between African American and Hispanic students. Among all the racial/ethnic groups, Asian students perceived student emotional engagement most favorably.

As for the grade-level differences, students' perceptions of cognitive–behavioral and emotional engagement were most favorable in elementary schools and least favorable in high schools. As suggested by the standardized coefficients, the significant differences in both types of engagement between middle and elementary schools ($b = 0.26$, $t = 14.41$, $p < .001$ for cognitive–behavioral engagement and $b = 0.44$, $t = 12.19$, $p < .001$ for emotional engagement) were larger than the differences between middle and high schools ($b = –0.16$, $t = –6.52$, $p < .001$ for cognitive–behavioral engagement and $b = –0.21$, $t = –4.22$, $p < .001$ for emotional engagement). Student engagement was not significantly associated with school size ($b = 0.00$, $t = –0.04$, $p = ns$ for cognitive–behavioral engagement and $b = 0.00$, $t = –0.52$, $p = ns$ for emotional engagement) or school racial/ethnic diversity ($b = 0.04$, $t = 0.59$, $p = ns$ for cognitive–behavioral engagement and $b = 13$, $t = 1.04$, $p = ns$ for emotional engagement). Finally, a school's percentage of students receiving FRPM was statistically related to both types of student engagement, but the standardized coefficients indicated that the effect size was negligible ($b = 0.00$, $t = –4.57$, $p < .001$ for cognitive–behavioral engagement; $b = 0.00$, $t = –3.12$, $p < .05$ for emotional engagement).

Multilevel Main Effects of Teaching of Social and Emotional Competencies, Teacher–Student Relationships, and Student–Student Relationships

When $TSEC_{student\ level}$, $TSEC_{school\ level}$, $TS_{student\ level}$ $TS_{school\ level}$, $SS_{student\ level}$, and $SS_{school\ level}$ were added sequentially as predictors of student engagement at the student and school levels, respectively, in Models 3–8, each factor accounted for additional variance beyond that which was explained by the variables added previously. Moreover, all of these six variables contributed higher percentages of variance explained in emotional engagement than cognitive–behavioral engagement. For example, $TSEC_{student\ level}$ accounted for 7.12% of variance explained in cognitive–behavioral engagement, whereas it accounted for 22.62% of variance explained in emotional engagement. In addition, the school-level variables contributed higher percentages of variance explained in both types of engagement than school-level variables. For example, 7.12% of variance in cognitive–behavioral engagement was explained by the addition of $TSEC_{student\ level}$, whereas 41.06% of variance in cognitive–behavioral engagement was explained by the addition of $TSEC_{school\ level.}$

Table 2. Statistical Estimates of Final Models (Model 9)

Fixed Effects	Cognitive–Behavioral Engagement		Emotional Engagement	
	Coefficient	*SE*	Coefficient	*SE*
Intercepts	0.11***	0.02	0.20***	0.02
Predictors at student level				
$TSEC_{student\ level}$				
Main effect	0.09***	0.01	0.20***	0.01
Grade-level difference: Elementary vs. middle	0.02	0.02	–0.02	0.02
Grade-level difference: High vs. middle	–0.05**	0.02	–0.06	0.02
$TS_{student\ level}$				
Main effect	0.20***	0.01	0.40***	0.01
Grade-level difference: Elementary vs. middle	–0.06***	0.02	0.03	0.02
Grade-level difference: High vs. middle	0.01	0.02	0.00	0.03
$SS_{student\ level}$				
Main effect	0.09***	0.01	0.26***	0.01
Grade-level difference: Elementary vs. middle	0.03*	0.02	–0.04	0.02
Grade-level difference: High vs. middle	–0.06*	0.02	0.02	0.02
Focal predictors at school level				
$TSEC_{school\ level}$				
Main effect	0.30**	0.09	0.18	0.1
Grade-level difference: Elementary vs. middle	0.02	0.24	–0.51	0.27
Grade-level difference: High vs. middle	0.16	0.31	–0.86*	0.36
$TS_{school\ level}$				
Main effect	0.10	0.09	0.65***	0.11
Grade-level difference: Elementary vs. middle	–0.23	0.19	–0.11	0.22
Grade-level difference: High vs. middle	–1.01**	0.35	0.88*	0.40
$SS_{school\ level}$				
Main effect	0.06	0.05	0.21***	0.06
Grade-level difference: Elementary vs. middle	0.13	0.13	0.3	0.14
Grade-level difference: High vs. middle	0.46*	0.19	0.02	0.22
Random Effects	***SD***	**Variance Component**	***SD***	**Variance Component**
Intercept	0.04	0.002***	0.05	0.003***
Gender slope	0.04	0.002**	0.07	0.004***
Race_D1 slope	0.03	0.001	0.06	0.004
Race_D2 slope	0.05	0.002	0.06	0.004**
Race_D3 slope	0.05	0.003	0.06	0.003
Race_D4 slope	0.02	0.000	0.03	0.001
TS slope	0.05	0.003***	0.06	0.003**
SS slope	0.03	0.001	0.05	0.002**
TSEC slope	0.04	0.002**	0.05	0.002*
Level-1, *r*	0.46	0.213	0.05	0.253

Note. *SE* = standard error; TSEC = teaching of social and emotional competencies; TS = teacher–student relationships; SS = student–student relationships. *$p < .05$. **$p < .01$. ***$p < .001$.

As shown in Table 2, when the moderating factors were included in Model 9, the three variables (i.e., TSEC, TS, and SS) continued to have relatively stronger main effects on emotional engagement than cognitive–behavioral engagement. This pattern was consistent at both student level and school level. At the student level, all three factors had significant main effects on both cognitive–behavioral and emotional engagement, with TS having the strongest main effect. At the school level, all three factors also had significant main effects on emotional engagement, with TS having the strongest main effect. For cognitive–behavioral engagement, only TSEC had a significant main effect at the school level.

Moderating Effects of Grade Level

As shown in Table 2, upon controlling for student and school demographics, significant grade-level differences were found in the associations between student engagement association and the three factors of interest (i.e., TSEC, TS, and SS) at both the student and school levels. However, when those significant moderating effects were graphed out using the Model Graphs function in HLM, only the grade-level difference in the association between student-level factors (i.e., $TSEC_{student\ level}$, $TS_{student\ level}$, $SS_{student\ level}$) and student engagement were found to be meaningful. The lines representing student engagement's associations with $TSEC_{school\ level}$, $TS_{school\ level}$, and $SS_{school\ level}$ across grade levels were parallel, which indicated that the grade-level differences in the school-level associations were not practically meaningful. Thus, the results reported will focus on the grade-level differences in the associations between student-level factors (i.e., $TSEC_{student\ level}$, $TS_{student\ level}$, $SS_{student\ level}$) and student engagement.

Grade-level differences in the associations between $TSEC_{student\ level}$ and student engagement. Results in Table 2 show that the positive relationship between $TSEC_{student\ level}$ and student engagement was stronger in elementary and middle schools than high schools. Moreover, as shown in Figures 1 and 2, middle school students reported higher cognitive–behavioral engagement and lower emotional engagement than high school students, irrespective of the level of $TSEC_{student\ level}$.

Grade-level differences in the associations between $TS_{student\ level}$ and student engagement. Results of Table 2 show that the magnitude of the positive $TS_{student\ level}$ association with cognitive–behavioral engagement was significantly stronger in middle and high schools than elementary schools. $TS_{student\ level}$ had the strongest main effect on emotional engagement among the three student-level predictors, and the magnitude of its association with emotional engagement did not vary significantly across grade levels. As shown in Figure 3, students in elementary schools reported generally higher cognitive–behavioral engagement than middle school students, and the discrepancy decreased under conditions of more positive $TS_{student\ level}$.

Grade-level differences in the associations between $SS_{student\ level}$ and student engagement. Results in Table 2 indicate that the strength of the association between $SS_{student\ level}$ and cognitive–behavioral engagement was significantly stronger in lower grade levels (elementary > middle > high schools). Figure 4 illustrates that elementary school students reported lower cognitive–behavioral engagement scores than middle school students under the condition of less positive SS, whereas they reported higher cognitive–behavioral engagement scores than middle school students under the condition of more positive SS. As shown in Figure 5, middle school students always reported higher cognitive–behavioral engagement than high school students, irrespective of the level of $SS_{student\ level}$. The association between $SS_{student\ level}$ and emotional engagement did not vary across grade levels, but high

Figure 1. Middle and High School Differences in the Association Between Teaching of Social and Emotional Competencies (Student Level) and Cognitive–Behavioral Engagement

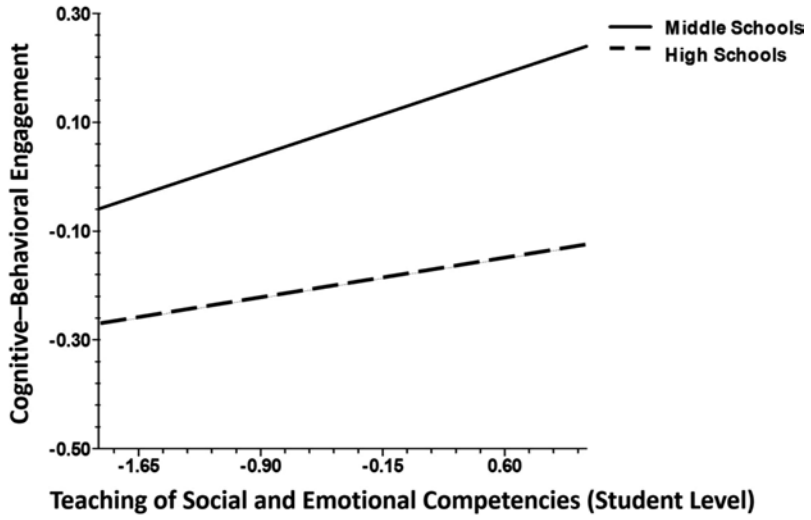


Figure 2. Middle and High School Differences in the Association Between Teaching of Social and Emotional Competencies (Student Level) and Emotional Engagement

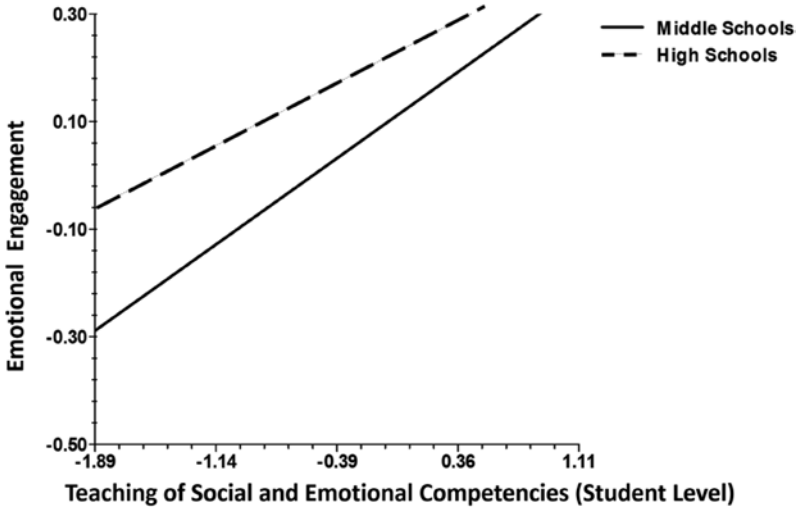


Figure 3. Elementary and Middle School Differences in the Association Between Teacher–Student Relationships (Student Level) and Cognitive–Behavioral Engagement

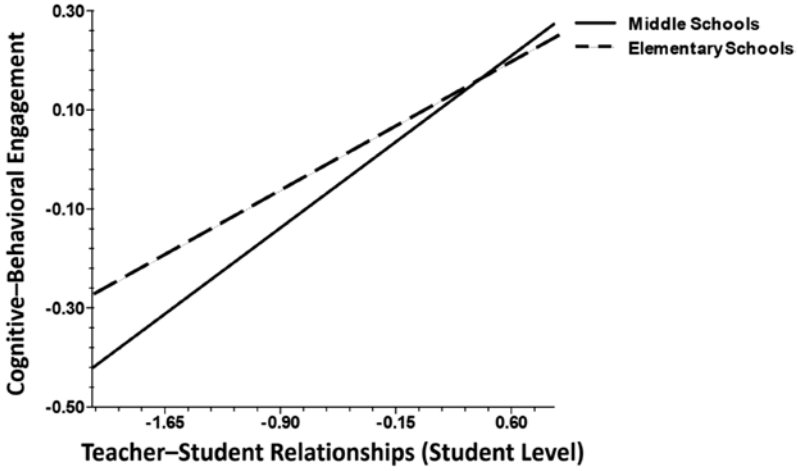


Figure 4. Elementary and Middle School Differences in the Association Between Student–Student Relationships (Student Level) and Cognitive–Behavioral Engagement

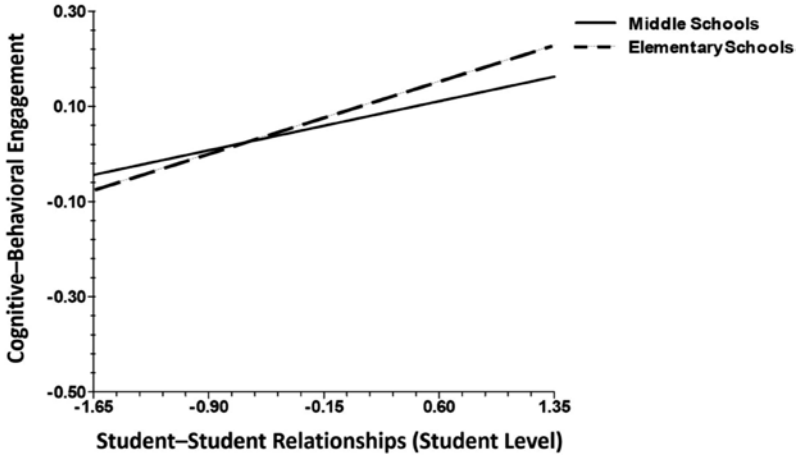


Figure 5. Middle and High School Differences in the Association Between Student–Student Relationships (Student Level) and Cognitive–Behavioral Engagement

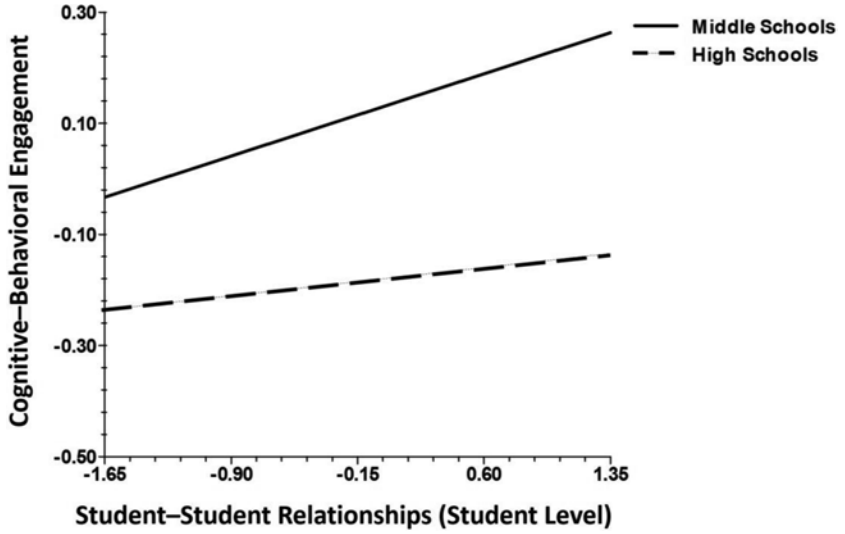
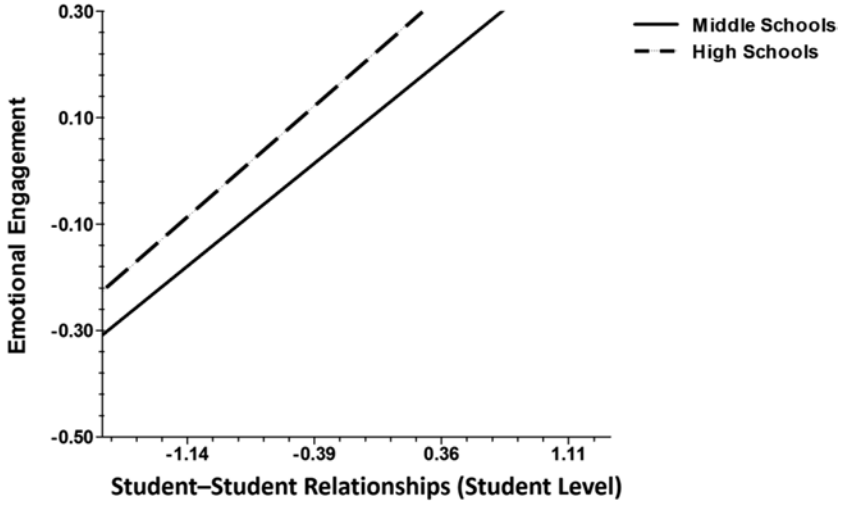


Figure 6. Middle and High School Differences in the Association Between Student–Student Relationships (Student Level) and Emotional Engagement



school students generally reported higher emotional engagement than middle school students, irrespective of the level of $SS_{student\ level}$, as shown in Figure 6.

DISCUSSION

The primary purpose of this study was to examine the multilevel associations between students' perceptions of three factors aligning with the school-wide SEL approach (i.e., TSEC, TS, SS) and their cognitive–behavioral and emotional engagement while controlling statistically for demographic variables. At both student and school levels, all three factors associated significantly with emotional engagement, with association with TS being the strongest. All three factors also had significant associations with cognitive–behavioral engagement at the student level, but at the school level only TSEC had a significant association with cognitive–behavioral engagement. Another primary purpose of this study was to examine grade-level differences in the associations between the three factors and student engagement. Moderating analyses revealed that the magnitude of the associations between the three factors and student engagement varied significantly depending on the type of engagement and the students' grade levels.

Although not a primary focus of the study, we also found significant effects for gender, race/ethnicity, and grade level. That is, consistent with previous research, female students reported greater cognitive–behavioral engagement and lower emotional engagement than male students (Wang & Eccles, 2012); Asian American students reported greater engagement, both cognitive–behavioral and emotional, than

students of other racial/ethnic groups (Bingham & Okagaki, 2012). As was also found by others (Wang & Eccles, 2012), students in lower grades reported greater cognitive–behavioral and emotional engagement.

Association Between Teaching of Social and Emotional Competencies and Student Engagement and Its Grade-Level Differences

At both the student and school levels, students' perceptions of TSEC were associated positively and significantly with both types of student engagement. This is consistent with previous research finding that effective TSEC leads to a number of positive outcomes (Durlak et al., 2011). At the student level, the main effect of TSEC was stronger for emotional engagement than for cognitive–behavioral engagement, whereas at the school level the main effect was stronger for cognitive–behavioral engagement. It is plausible that when students receive adequate SEL instructional support from their classroom teachers, they develop higher prosocial skills and more positive relationships with their teachers and peers, which lead to more positive perceptions of emotional engagement. When students perceive an overarching school culture of teachers being engaged in TSEC, they are likely placed in schools whose administrators and teachers value school-wide SEL and integrate it into their daily behavioral management practice. These factors could contribute to higher cognitive–behavioral engagement among students.

The present study is the first of its kind, examining the grade-level differences in the association between TSEC and student engagement across elementary, middle, and high school. We found that the positive associations between students' perceptions of TSEC and student engagement were stronger in elementary and middle schools than high schools. Significant grade-level differences were found for emotional engagement at both student and school levels and for cognitive–behavioral engagement at the student level. The relatively weaker influence of TSEC on student engagement in high schools compared with elementary and middle schools might be attributable to both developmental and environmental factors. First, compared to elementary and middle school students, high school students demonstrate higher social and emotional independence from teachers, parents, and other adults (Williamson, Modecki, & Guerra, 2015). Second, with increased maturation of emotional and cognitive abilities, older students are more capable of building social and emotional competencies through self-directed and self-reflective learning. This self-motivated SEL might also make these students less responsive to SEL that is teacher centered as opposed to student centered. In addition to developmental factors, high schools tend to have much larger school sizes and higher academic demands than elementary and middle schools (Alspaugh, 1998). These factors, in part, contribute to the fact that fewer school-wide SEL efforts take place in high schools (Cervone & Cushman, 2014; Williamson et al., 2015). With less frequent direct interactions with students on a daily basis, high school teachers are likely to have fewer opportunities for TSEC and to view it as less of a responsibility (Johnson, 2009).

Association Between Teacher–Student Relationships and Student Engagement and Its Grade-Level Differences

At the student level, students' perceptions of TS were more strongly related to both types of student engagement than their perceptions of SS and TSEC. The strong influence of TS on both types of engagement is consistent with a previous longitudinal study in which TS were found to have long-lasting influence on students' behavioral, cognitive, and emotional outcomes (Hamre & Pianta, 2001). It is also consistent with other researchers' notion that general TS encompass the emotional climate of the classroom as well as teachers' instructional support and classroom organization, which may affect a broad range of child outcomes across social, emotional, and academic domains (Serdiouk, Rodkin, Madill, Logis, & Gest, 2015). Moreover, the significant student- and school-level influences of students' perceptions of TS on emotional engagement indicated that students' perceptions of emotional engagement are influenced by both the positive relationships they establish with their classroom teachers and the average quality of TS aggregated at the school level. We also found that at the student level the positive association of TS with cognitive–behavioral engagement was significantly stronger in middle and high schools than elementary schools. This stronger influence of TS in middle and high schools is likely explained by both developmental and structural factors. Developmentally, young adolescents are testing their fledgling independence from parents by reaching out for closer connections to adults outside the home, like teachers (Vollet et al. 2017). Structurally, the increasing demands of school activities in middle and high schools require more specialized instructional support from teachers; thus, TS has a stronger influence on cognitive–behavioral engagement in middle and high schools than in elementary schools.

Association Between Student–Student Relationships and Student Engagement and Its Grade-Level Differences

We found that students' perceptions of SS at both the student and school levels had significant main effects on students' emotional engagement. Similar to TS, this suggests that students' perceptions of emotional engagement are influenced by both the positive relationships they establish with their immediate peers and their perception of the quality of peer relationships aggregated at the school level. These results are consistent with Lynch et al.'s (2013) findings that school-wide peer culture plays an important role in promoting student engagement. These results also expand their study by examining peer relationships' linkages with two specific domains of student engagement, not student engagement in general.

In terms of grade-level differences, the association of SS with cognitive–behavioral engagement was significantly stronger in lower grade levels (i.e., elementary > middle > high schools). This grade-level difference is likely due to the structural change along with the change of grade levels. In comparison to higher grade levels, students in lower grade levels (e.g., elementary school students) participate in school activities in a smaller setting. The more frequent interactions and close relationships within a smaller peer group might contribute to the stronger influence of peer relationships on cognitive–behavioral engagement. Unlike with cognitive–behavioral engagement, results showed that peer relationships demonstrated a consistent and strong association with emotional engagement with no significant differences across grade levels. This result is not consistent with Li et al.'s (2011) finding that the positive influence of peer support on emotional engagement appears stronger when students are older. One possible reason is that the present study included participants across elementary, middle, and high schools, whereas Li et al.'s study only focused on middle school students in grades 6–8. It is also possible that developmentally older students do relate their emotional engagement more closely to their peer relationships. However, this age influence might likely be offset by the structural influence of grade levels when students move from elementary to middle school and then to high school.

Limitations

Our findings should be interpreted in light of the study's limitations. First, the research design was cross-sectional and correlational, not longitudinal or experimental. Although it is tempting to emphasize the theoretical effect of TS, SS, and TSEC on student engagement outcome, we cannot confidently draw conclusions about the causality or directionality of these relationships. It is also likely that highly engaged students keep more positive relationships with teachers and peers in schools and are more receptive to TSEC. Second, the study relied primarily upon students' self-reporting, which could introduce bias into the results (Adams et al., 2005). For example, students may experience social pressure when they report their school experience, especially when assessment measures are group administered in a classroom setting (Austin & Joseph, 1996). Third, self-report measures assume that students can read and understand the directions of the survey, the definitions of the different points on the Likert scale, and the meaning of the items. However, students' understanding and interpretations in these areas can vary widely depending on their abilities and personal experiences (Beaton, Bombardier, Guillemin, & Ferraz, 2000). Fourth, according to the social–ecological framework, the norm of student engagement at the classroom and school levels could also potentially influence students' individual perceptions of student engagement, in addition to the student- and school-level influence of the SEL approach and demographic backgrounds. Although it is beyond the scope of the present study, it is important for future studies to examine how classroom- and school-level norms of engagement influence students' individual perceptions of student engagement.

Practical Implications

The concurrent main effects of TS, SS, and TSEC on student engagement suggest that these educational strategies, which largely underlie the school-wide SEL approach to prevention of behavior problems and the promotion of mental health, are promising in promoting student engagement. In particular, the effects of TS and SS on emotional engagement across grade levels indicate that they are important in establishing a caring social/relational climate that nurtures positive relationships among students and between students and teachers (Lapan & Kosciulek, 2001). The significant main effects of these three factors found at both the student and school levels suggest that student engagement is influenced not only by the students' immediate experiences with their own teachers, peers, and TSEC, but also by their perceptions of these factors school-wide. Thus, it is important to establish a school-wide support system to promote students' positive school-wide perceptions. Some important school factors that help establish a school-wide support system include cooperation and communication among teachers, teacher training, clear procedures and structures, support from the school principal, a well-defined school policy or vision, a caring and inviting school climate, and integration of SEL into the general curriculum and daily teaching practices (Aluede, Imonikhe, & Afen-Akpaida, 2007; Best, 1999; Hui, 2002).

The significant main effects of TSEC at both the student and school levels suggest that it is important to prepare teachers with necessary skills for implementing SEL. This not only helps promote social–emotional competencies and favorable academic outcomes, but also promotes teachers' well-being and reduces stress and burnout (Jennings & Frank, 2015). To better prepare teachers with these skills, it is essential to embed SEL into preservice teacher education so that social–emotional competencies may be promoted both in teachers and their students (Schonert-Reichl, Hanson-Peterson, & Hymel, 2015).

Finding significant and meaningful main effects of demographic factors (i.e., gender, race/ethnicity, and grade levels) on student engagement challenges educational policy makers and educators to recognize that student engagement is often a function of various factors at both the individual and school levels. The strong grade-level differences in student engagement and the significant and meaningful moderating effects of grade level in student engagement's associations with the three factors related to a school-wide SEL approach suggest that different policy expectations and standards are warranted at the different grade levels to support students during organizational and developmental transitions.

Summary

Grounded in the social–ecological theory, this study provides initial empirical evidence supporting the

importance of the two general strategies of a school-wide SEL approach in promoting student engagement. These two strategies are the systematic and quality instruction of SEL skills and the establishment of a caring, safe, and cooperative school-wide environment. This study suggests that promoting TSEC and positive TS and SS are important factors to consider when designing and implementing school-wide programs that target student engagement promotion. Moreover, the significant and concurrent main effects of these three factors found at both student and school levels support the notion that student engagement is a multilevel construct that is influenced by ongoing and reciprocal interactions between multilevel subsystems across individuals and school context (Bronfenbrenner, 1986; Sampson & Laub, 1993). The demographic effects of students and schools, particuarlly the grade-level differences, are also important factors to consider in school-wide SEL and engagement promotion.

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