Development and Validation of a Measure to Assess Early Adolescents’ Perceptions of Caring Student-Teacher Relationships

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There is accruing evidence documenting the importance of caring student-teacher relationships in fostering students’ social and emotional competence (SEC), well-being, and school success, particularly during early adolescence. However, few studies have investigated dimensions of caring student-teacher relationships from the perspective of early adolescents. This study describes the development and validation of the Caring Student-Teacher Relationship (CSTR) scale. Participants included 222 sixth and seventh grade middle school students who completed the CSTR and self-report measures of classroom supportiveness, prosociality, well-being, and school functioning. Students also assessed their teachers’ SEC. Classroom teachers (n = 14) completed self-report measures of mindfulness in teaching and burnout, reported on closeness and conflict in their relationships with students, and rated students’ SECs and academic success. Results from an Exploratory Factory Analysis (EFA) indicated high internal consistency of the CSTR and a two-factor solution: Teacher Support and Attunement and Caring Teacher Qualities. Further analyses revealed that the two factors of the CSTR were related in expected directions to measures of teacher support (e.g., academic and personal) and SEC, and to students’ reports of classroom supportiveness, prosociality, well-being, and school functioning. Positive associations of the two CSTR factors to teacher reports of students’ SEC and academic success were also found. The two factors of the CSTR were positively associated with teachers’ reports of mindfulness in teaching and negatively associated with teachers’ burnout. These findings have implications for understanding the role that students’ perceptions of student-teacher relationships may play in promoting their positive adaptation and success in school.

Keywords: psychometrics, measure development, student-teacher relationships, early adolescence, education, student perceptions

INTRODUCTION

Mounting evidence posits that positive student-teacher relationships promote students’ school engagement (Engels et al., 2016), prosocial behaviors (Longobardi et al., 2020; Wentzel et al., 2010), and well-being (Guess and McCane-Bowling, 2016). Moreover, these relationships become increasingly critical as students enter adolescence (Ruzek et al., 2016). This is because evidence
from a number of studies has consistently shown that early adolescence in particular is a time when individuals need supportive teacher relationships due to the nature and pace of changes that occur across so many levels – changes due to puberty, changes in the nature and function in relationships with peers and parents, and school transitions (Offer and Schonert-Reichl, 1992; Eccles et al., 1993). Unfortunately, there exists a relative dearth of studies that have investigated student-teacher relationships from the perspective of middle school students, particularly in relation to young adolescents’ experiences of teacher caring (e.g., Wentzel, 1997; Longobardi et al., 2016; Brinkworth et al., 2017). The present study attempts to redress this by developing and evaluating the validity of a student self-report measure of caring student-teacher relationships derived from students’ own descriptions of the qualities of important and caring teachers.

Researchers have prioritized different dimensions of student-teacher interactions as having the greatest impact on students (Sabol and Pianta, 2012). Much of the research in this field has focused on the impact of academic support and instructional practices on student outcomes (McCombs et al., 2008; Downer et al., 2015), whereas more recently researchers have begun to focus their attention on understanding the impact of non-academic aspects of teacher support in relation to student-teacher interactions and student outcomes (Koomen and Jellesma, 2015; Longobardi et al., 2016).

Nel Noddings (2015), recognized as a pioneer in the field because of her emphasis on an ethic of care in education, posits that, just like parenting, educating children should first and foremost involve attending to students’ needs. The field of social and emotional learning (SEL) has supported this notion over the past few decades, by demonstrating that when teachers are attuned to the social and emotional needs of their students, there are concomitant positive changes in classroom relationships, student engagement, and academic achievement (Wentzel, 2002; Roorda et al., 2011; Ruzek et al., 2016).

As Nodding has stated, however, “as we explore caring in the context of caregiving—any long-term unequal relation in which one person is carer and the other cared-for—we will ask about the virtues that support caring” (2015, p. 70). As such, recent years have witnessed a burgeoning literature investigating the teacher characteristics and social and emotional competencies (SEC) that support student-teacher relationships, foster optimal classroom climates, and nurture positive student development (Jennings and Greenberg, 2009; Jones et al., 2013; Schonert-Reichl, 2017). Specifically, this research suggests that socially and emotionally competent teachers exhibit an increased capacity to attend to their students’ needs (Roeser et al., 2012) and create positive environments in their classrooms (Collie and Perry, 2019). Jennings and Greenberg (2009) clearly illustrate this pathway in their “Prosocial Classroom” model that posits that teachers high in SEC and well-being have more positive student-teacher relationships, manage their classrooms more effectively, and implement SEL programs more competently. These, in turn, create a healthy classroom climate and positive social, emotional, and academic outcomes for students.

Researchers in the field of contemplative science have also discussed the “unnamed domain” of teacher expertise, which goes beyond the traditional aspects of content knowledge and pedagogy and includes teachers’ dispositions and social and emotional skills, such as calmness, clarity of mind, and kindheartedness (Kabat-Zinn, 1994; Rodgers and Raider-Roth, 2006; Rickert et al., 2020). Moreover, contemplative educators and researchers have emphasized the importance of mindfulness in teaching (Rickert et al., 2020), which involves qualities such as focused attention (Kabat-Zinn, 1994), teacher presence (an awareness, receptivity, and connectedness to the mental, emotional, and physical needs of the students; Rodgers and Raider-Roth, 2006), and attunement (understanding, sympathy, and knowledge about the student; Skinner and Belmont, 1993). These qualities have emerged in the student-teacher literature as important aspects of these relationships (Wentzel, 2003; Rickert et al., 2020). Taken together, burgeoning research emphasizes the importance of teacher SEC and mindful awareness of and responsiveness to students’ needs in creating positive student-teacher relationships.

Despite the growing interest in understanding student-teacher relationships, much of the extant empirical research examining the impact of teacher SECs on student-teacher relationships has focused on teachers of younger students in elementary schools (Yoon, 2002; Mashburn et al., 2006). Nonetheless, there is now an emerging corpus of research investigating associations between teacher characteristics and student-teacher relationships in early adolescence (Longobardi et al., 2016; Oberle et al., 2020). For example, Braun et al. (2019) found that middle school teachers’ self-reports of mindfulness were significantly and positively related to observer ratings of the quality of emotional support in teachers’ interactions with their students. In another study of early adolescents and their teachers, Harding et al. (2019) found that positive associations between teachers’ well-being and students’ well-being were partially moderated by improvements in students’ evaluations of their student-teacher relationships. These studies point to the value of investigating teachers’ qualities and competencies in relation to student-teacher relationship quality, particularly during early adolescence.

Notwithstanding these recent developments in the field, studies that consider early adolescents’ perceptions of positive dimensions of their relationships with their teachers are relatively scant. Instead, the majority of studies that have examined student-teacher relationships have relied heavily on other perspectives (i.e., observational, teacher, and parent ratings) (Doumen et al., 2012; Hughes et al., 2014; Ruzek et al., 2016) and/or have focused on the early years of school (i.e., preschool, Kindergarten) (Ladd et al., 1999; Gaessens et al., 2017). This may be due, in part, to the relative paucity of measures available that assess early adolescents’ perspectives of supportive student-teacher relationships (Brinkworth et al., 2017).

When it comes to adolescents in particular, although there is evidence suggesting some congruence between students’ and others’ perceptions with regard to relationship quality (Koomen and Jellesma, 2015; Cipriano et al., 2019), adolescents’ perspectives often differ from those of their
parents or teachers (Waters et al., 2003; Koepke and Harkins, 2008; Rickert et al., 2020). This remains particularly true for student and teacher perceptions of their dyadic relationships (Zee and Koomen, 2017; Prewett et al., 2019). Moreover, there may actually be a disconnect between what teachers feel they bring to the relationship and what students actually experience. For example, in a study of fifth and sixth grade students, Prewett et al. (2019) found that teachers’ reports of the emotional support they provided to students did not predict students’ perceptions of quality of the student-teacher relationship. In addition, the relation between teachers’ reports and students’ reports was nonsignificant and close to zero. Yet students’ own perceptions of their teachers’ emotional support positively and significantly predicted students’ perceptions of student-teacher relationship quality.

Taken together, it appears that research that relies solely on teacher ratings of student-teacher relationship quality and does not consider the students’ perspective may underestimate the role that student-teacher relationships can play in predicting students’ positive development. To better understand the connection between student-teacher relationships and prosocial development, classroom climate, well-being, and school functioning, it is critical that both the perspective of the student and the teacher be considered (Brinkworth et al., 2017). Also needed is research that examines gender differences in students’ perceptions of their student-teacher relationships. Indeed, to date there have been mixed findings on gender differences in student-teacher relationships (Wentzel, 1998; Kurdi and Archambault, 2018), with some research indicating no differences (Coliaianne et al., 2020) and others showing gender differences (McFarland et al., 2016; Zee and Koomen, 2017). Because of the mixed findings, in the present study gender differences in students’ perceptions of their teachers were also examined.

In summary, there is a need for well-designed and validated measures that assess the qualities of caring student-teacher relationships from the perspectives of early adolescent students. The majority of studies that have investigated student-teacher relationships with early adolescents have utilized either unvalidated sets of items developed for a particular study (Pössel et al., 2018; Scales et al., 2020) or have employed measures that do not focus specifically on caring dimensions of the student-teacher relationship (Reddy et al., 2003; Brinkworth et al., 2017). Moreover, many of the extant measures that have been used to assess the quality of relationships in adolescent samples have been either domain-general (i.e., were designed for use with any caregiver, rather than tailored to the specific context of student-teacher relationship) (Ricard and Pelletier, 2016; Prewett et al., 2019) or have asked students to report more generally on all of the teachers in their school rather than to report on a specific teacher (e.g., Gallagher et al., 2019).

The Present Study

Given the growing evidence of the importance of student-teacher relationships in early adolescence and the limitations of the currently available student-report measures of student-teacher relationships, the present study was designed to address gaps in the field by developing and evaluating the reliability and validity of the inferences from the scores of a student report measure of caring in student-teacher relationships – the Caring Student Teacher Relationship scale (CSTR). Although some scales exist that assess students’ perceptions of the presence or absence of broad teacher support (Brinkworth et al., 2017; Prewett et al., 2019), few include more detailed items about teachers’ caring behaviors and attunement within this relationship. In addition, very few measures to date have been developed using middle school students’ own voices (i.e., Brinkworth et al., 2017). Therefore, the student self-report measure developed in this current study was derived from middle school students’ descriptions of important teachers, in an effort to capture the aspects of care, support, and attunement within student-teacher interactions that has particular relevance for early adolescent students.

In the current study, we examined evidence for construct validity of the CSTR, through the investigation of 1) factor structure and internal consistency, 2) demographic differences in the CSTR, and 3) convergent and discriminant associations between CSTR and other constructs of students’ prosociality, classroom context, well-being, and school functioning, and teachers’ mindfulness and burnout.

We hypothesized—based on previous research indicating both age and gender differences in student-teacher relationship quality (Eccles and Roeser, 2011; Zee and Koomen, 2017) - to find demographic differences of small effect sizes on the CSTR. With regard to convergent and discriminant validity evidence, we hypothesized the CSTR to have significant relations with measures of teacher support, burnout, and mindfulness as well as measures of student social, emotional, and academic adjustment, to varying effects. First, in support of convergent validity, we hypothesized the CSTR to be highly related to but not redundant with other student-reports of teacher support and SEC. Moreover, research has demonstrated that teacher burnout can both impact (Longobardi et al., 2014) and be impacted by Harding et al. (2019) student-teacher relationship quality, thus we expected a moderate association between CSTR and teacher burnout. Next, due to research showing significant, positive relations between supportive student-teacher relationships and positive classroom climate and early adolescent students’ prosocialal tendencies (e.g., Wentzel, 2010), we hypothesized to find positive and significant correlations between the CSTR and student-rated classroom supportiveness and prosociality (prosocial goal, altruism), with medium to large effect sizes. In contrast, research has shown positive, but moderate, associations between student-teacher relationships and aspects of students’ resilience (e.g., optimism, self-regulation, stress regulation) (Thomson et al., 2015; Zee and de Bree, 2017). Therefore, we hypothesized the CSTR to have significant, positive correlations between the CSTR and measures of students’ optimism and self-efficacy and a significant, negative correlation between the CSTR and students’ perceived stress, with small to medium effect sizes. To examine discriminant evidence, we hypothesized significant but small to medium correlations between the CSTR and student reports of academic efficacy and teacher measures of academic success (i.e., Scales et al., 2020). We also expected a significant but
small positive correlation between CSTR and teacher-rated measures of student-teacher relationship quality, given the disparity often found between early adolescent and teacher perspectives of their relationships (Zee and Koomen, 2017). Finally, because of the content of the CSTR, which included elements of mindfulness, we anticipated a moderate association between the CSTR and teacher measures of their own mindfulness (i.e., Rickert et al., 2020).

METHODS

Participants

Data for this study were collected during the baseline portion of a larger study investigating the efficacy of a social and emotional learning (SEL) program. This study took place in a public-school district in a suburban, predominantly middle-class community in British Columbia (BC), Canada. The mean household income for the neighborhoods in which each of the three schools was located was $77,790.00 CAD (Range: $60,907–$106,338 CAD). This mean household income falls slightly below the Canadian average (Statistics Canada, 2017). Given the focus of the current study on caring student-teacher relationships, it is important to note that BC’s Ministry of Education has a long history of integrating the promotion of students’ social and emotional development into its education system. For example, in 2016 the BC Ministry of Education legislated a revised curriculum for all elementary and secondary school students in the province which included an explicit focus on promoting students’ personal and social competencies (https://curriculum.gov.bc.ca).

Three middle schools in the district, that were equivalent in school size, achievement level, socioeconomic status (SES), and ethnic and racial diversity, were selected as potential sites for the research. They were also chosen because the principal had an interest in implementing SEL programs to promote students’ SEC and well-being. Participants recruited for the study included 350 students in 14 classrooms across the three middle schools. Of those, 260 received parental/guardian consent and gave their own assent to participate. Some students were absent on the day of the survey (n = 8) or opted out of the entire study after providing assent (n = 9). In addition, 21 students were excluded from the study due to missing significant portions of the measures, resulting in a final sample size of 222 students who had complete data for this study (participation rate = 63%). Analyses indicated that the students who did not participate did not differ from participating students in terms of gender (F [1, 242] = 0.15, p = 0.70), age (F [1, 242] = 1.26, p = 0.26), family composition (F [1, 239] = 0.66, p = 0.42), or first language learned (F [1, 240] = 0.11, p = 0.74).

The final sample of 222 sixth (n = 138) and seventh (n = 83) grade students was comprised of 112 boys (50.5%), 109 girls (49%), and one student (0.5%) who identified their gender as something other than boy or girl. The mean age of participants was 11.87 (SD = 0.56; Range: 11.00–13.02). The majority of students (84%) reported English as the first language they learned at home, the next highest reported first language was Mandarin (8%). The rest of the students reported several other languages (e.g., Cantonese, French, Spanish, Korean, Filipino, Hindi, Punjabi, Vietnamese). These reported languages were reflective of the breadth of first languages found in the neighborhood populations in which the schools were located (Statistics Canada, 2017). Furthermore, the ethnic origins of people of BC comprise Indigenous Peoples (6.6%), European (62.7%), Asian (28.8%), Black (1.7%), and Latinx (1.5%) (Statistics Canada, 2017). The majority (78%) of students indicated they lived with both parents and/or stepparents (either full time or part-time), while about 10% live with single parents, and 12% live with parents and grandparents. The participating teachers (n = 14; nine female, five male) ranged in age from 25.23 to 52.48, with a mean age of 40.40. Half (50%) of the teachers reported their ethnicity as Caucasian/White, 14.3% as East Asian, 7.1% as South Asian, and the remaining 28.5% as multiracial (e.g., Indigenous and Caucasian) or something else (e.g., Roma). All teachers had worked between one and 25 years as a teacher, with an average of 11.86 years of teaching. Five teachers indicated B.Ed. as their highest education, two indicated a post-baccalaureate diploma, and seven had a graduate degree (e.g., M.A., M.Ed.).

Procedure

Approval to conduct the research was received from the university research ethics board. Following approval from the school district’s ethics committee, principals from three middle schools were contacted to request their participation in this study. A total of 14 teachers from these three schools were recruited to participate. Following, the Principal Investigator and/or her research assistants visited the schools and explained the study to the students in each of the classrooms in child-friendly language, provided parent/guardian consent forms, and answered any questions the students had. Teacher consent, parent/guardian consent, and student assent were obtained from all participants.

Trained graduate student research assistants (RAs) administered the student self-report surveys during two, 30-min sessions in the same school day. The RAs read the questions out loud to account for language differences and ensure students fully understood the items before providing their responses. Teachers were also asked to complete teacher rating surveys on each participating student within 2 weeks of the administration of the student surveys.

Measures

For all of the student report measures in which students were asked to report on their teacher or their classroom, students were told to respond with respect to the specific classroom they were in at the time of survey administration with reference to their classmates and their teacher in that class. For each scale, items were averaged to form a composite score.

Demographics

Student demographics were obtained by asking students to respond to questions about their birthdate, grade, gender identity, family composition, and first language learned at home.
Measures of Teacher Support and the Student-Teacher Relationship

As one means of exploring validity evidence for the CSTR, we included extant measures of teacher support and student-teacher relationship quality, as measured by both students and teachers. Students responded to four items from the Teacher Personal Support subscale of the Classroom Life Measure (Johnson et al., 1985; Wentzel, 1997), a measure designed to assess students’ perceived support from their teachers (e.g., “My teacher cares about me”) and 10 items from the Child and Adolescent Support Scale (CASSS, Malecki et al., 2000), a scale assessing students’ perceived academic support from teachers (e.g., “My teacher makes it okay to ask questions”). Responses were made on a 5-point Likert-type scale ranging from 1 (not at all true) to 5 (very true). The Teacher Support subscale of the CLM has been shown to have high internal consistency (α = 0.86) in previous research with sixth to eighth grade students (Wentzel, 1997). In the current study, Cronbach’s alpha was 0.86 and ordinal alpha was 0.88 for the CLM. The CASSS has also been shown to have high internal consistency (α = 0.93) and validity with samples of early adolescents (CASSS; Malecki and Demaray, 2002). For the current study, Cronbach’s alpha was 0.92 and ordinal alpha was 0.93 for CASSS.

To assess teachers’ perceptions of their relationships with each of their students, teachers completed 12 items from the 15-item short form of the Student-Teacher Relationship Scale (STRS; Pianta, 2001; Koomen et al., 2012), which is comprised of two subscales: Closeness and Conflict. The five items included from the Conflict subscale assess the extent to which the teacher perceives conflict in the student-teacher relationship (e.g., “This child and I always seem to be struggling with each other”) whereas the seven items from the Closeness subscale assess the amount of closeness felt by the teacher within the student-teacher relationship (e.g., “I share an affectionate, warm relationship with this child”). Three items were considered inappropriate for the middle school context and, therefore, were omitted for this study (e.g., “This child is uncomfortable with physical affection or touch from me”). Teachers rated each student on the extent to which they agreed with each statement using a five-point Likert-type scale from 1 (definitely does not apply) to 5 (definitely applies). Closeness and Conflict scores were created for each student by averaging item scores for each subscale, with higher scores representing higher levels of each dimension. Evidence for the concurrent and predictive validity of these subscales of the STRS has been demonstrated extensively in previous research (e.g., Pianta, 2001; Koomen et al., 2012). Reliability of the Conflict and Closeness subscales have been shown to be consistently high in previous research, with Cronbach’s alpha of 0.93 and 0.86 respectively (Pianta, 2001). For the present study, Cronbach’s alpha was 0.89 and ordinal alpha was 0.90 for Closeness, and Cronbach’s alpha of 0.89 and ordinal alpha of 0.92 for Conflict.

Teacher SEC, Burnout, and Mindfulness

To assess three characteristics related to teacher support (Jennings and Greenberg, 2009), students and teachers responded to measures of teacher SEC, burnout, and mindfulness. Students responded to a 6-item measure which assessed their perceptions of their teacher’s social and emotional competence via the Teacher Social and Emotional Competence scale (TSEC; Whitehead, 2013). This measure asks students to respond to items such as “My teacher seems to enjoy teaching our class” using a 5-point Likert-type scale ranging from 1 (not at all true) to 5 (very true). Previous studies have found evidence supporting the construct validity and internal consistency of the TSEC with fifth to seventh grade students (α = 0.79; Whitehead, 2013) and with fourth to seventh grade students (α = 0.86; Oberle et al., 2020). In the present study, Cronbach’s alpha was 0.78 and ordinal alpha was 0.81.

To assess teacher burnout, teachers were asked to complete the Emotional Exhaustion and Depersonalization subscales of the Maslach Burnout Inventory (MBI; Maslach et al., 1996). The Emotional Exhaustion subscale contains items such as “How often do you feel emotionally drained from your work?” whereas the Depersonalization subscale includes items like “How often do you feel you have become more callous toward people since you took this job?” Teachers responded to these items on a 7-point Likert-type scale ranging from 1 (never) to 7 (every day). In this study, the two subscales were significantly correlated (r = 0.76, p < 0.001), therefore, to capture a wider range of burnout characteristics in teachers, we formed a burnout composite by averaging scores on the two sum subscales. This burnout composite has been used in previous research with teachers of early adolescents, where a similar correlation of 0.77 was found between the two subscales (Oberle and Schonert-Reichl, 2016). Previous research has found high internal consistency of both subscales and the burnout composite (Emotional Exhaustion: α = 0.92; Depersonalization: α = 0.80; burnout composite: α = 0.93) when used with elementary school teachers (Oberle and Schonert-Reichl, 2016). In the current study, Cronbach’s alpha was 0.92 and ordinal alpha was 0.91 for the Emotional Exhaustion subscale and Cronbach’s alpha was 0.78 and ordinal alpha was 0.84 for Depersonalization subscale. Cronbach’s alpha was 0.93 and ordinal alpha was 0.92 for the burnout composite.

Teachers reported on their mindfulness in teaching via the Intrapersonal Mindfulness and Interpersonal Mindfulness subscales from the Mindfulness in Teaching scale (Frank et al., 2016). The Intrapersonal Mindfulness subscale assesses teachers’ openness and receptivity in interactions with students and contains items such as “When I am upset with my class, I calmly tell them how I am feeling.” The Intrapersonal Mindfulness subscale focuses on present-centered awareness (Kabat-Zinn, 1990) (i.e., attentiveness and focus on the present moment) and includes reverse-coded items such as “I rush through activities with my class without being really attentive to them.” Responses were made on a 5-point Likert-type response scale ranging from 1 (never) to 5 (always true). After reverse coding for relevant items, items are averaged with higher scores representing higher levels of Intrapersonal Mindfulness and Interpersonal Mindfulness. Previous research has demonstrated the internal consistency of the Intrapersonal Mindfulness subscale (α = 0.87) and the Interpersonal Mindfulness subscale (α = 0.71), as well as preliminary evidence for the validity of this scale for use with teachers (Frank et al., 2016). Cronbach’s alpha for the current study...
was 0.78 and ordinal alpha was 0.79 for the Intrapersonal Mindfulness, and Cronbach’s alpha was 0.76 and ordinal alpha 0.86 for Interpersonal Mindfulness.

Classroom Supportiveness
To assess students’ perceptions of general supportiveness in the classroom, students were asked to respond to the 14-item Classroom Supportiveness subscale of the Sense of Classroom as a Community Scale (Battistich et al., 1997). This subscale assesses the degree to which students evaluate their classmates as supportive and helpful (e.g., “Students in this class help each other learn”). Students responded to the items using a 5-point Likert-type scale from 1 (disagree a lot) to 5 (agree a lot). Evidence for the validity and reliability of this subscale has been demonstrated in previous research (Battistich et al., 1997). For the present study, internal consistency as assessed via Cronbach’s alpha was 0.90 and ordinal alpha was 0.91.

Prosociality
Students and teachers reported on dimensions of students’ prosociality, namely prosocial goals, altruism, and social and emotional competence (SEC). Specifically, students responded to the 6-item Prosocial Goals subscale of the Social Goals Scale (Wentzel, 2003) and the 4-item Altruism Adolescent Scale (Lippman et al., 2014). The Prosocial Goals subscale assesses students’ prosocial intentions with items such as “How often do you try to be nice to kids when something bad has happened to them.” Responses were made on a five-point Likert-type scale from 1 (never) to 5 (always). Extensive research has provided evidence of reliability and validity with middle school students (e.g., Wentzel, 1998). The Altruism Adolescent Scale assesses students own evaluations of their altruism with items such as “I go out of my way to help others” and respond to the question “How true is each statement for you?” Responses were made on a 5-point Likert-type scale ranging from 1 (not at all like me) to 5 (exactly like me). Previous research has shown evidence of good internal consistency for this scale with students ages 12–17 (Lippman et al., 2014). In the present study, internal consistency was found to be good; Cronbach’s alpha = 0.84 and ordinal alpha = 0.85, for the Prosocial Goals subscale; Cronbach’s alpha = 0.83 and ordinal alpha = 0.84 for the Altruism Adolescent Scale.

To assess teachers’ evaluations of each of their students’ SEC related to prosociality, teachers responded to the 9-item Social and Emotional Competence subscale of the Teacher Social Competence Rating Scale (TSCRS; Kam and Greenberg, 1998). Teachers responded to items such as “Shows empathy and compassion for others’ feelings” and “Provides help, shares materials, and acts cooperatively with others” with a 5-point Likert-type scale from 1 (almost never) to 5 (almost always). Evidence of the validity and reliability of this scale has been supported by previous research (Kam and Greenberg, 1998) and good internal consistency has been found with samples of fourth to seventh grade students (Schonert-Reichl and Lawlor, 2010). Cronbach’s alpha for teacher-rated SEC was α = 0.92 and ordinal alpha was 0.93 in the current study.

Well-Being
In order to measure three facets of students’ well-being, students responded the 9-item Optimism subscale of the Resiliency Inventory (Noam and Goldstein, 1998) and the two subscales of the 10-item version of the Perceived Stress Scale (PSS-10; Cohen and Williamson, 1988): Perceived Helplessness (6-item) and Perceived Self-Efficacy (4-item). Optimism has been identified as an important component of children and adolescents’ resiliency (Noam and Goldstein, 1998; Thomson et al., 2015) and therefore was included in the operationalization of student well-being for this study. The Optimism subscale asks students to respond to items like “More good things than bad things will happen to me” using a 5-point Likert-type scale ranging from 1 (not at all like me) to 5 (always like me). Previous research has demonstrated good internal consistency of the Optimism subscale with samples of fourth to seventh grade students (Thomson et al., 2015). The PSS-10 asks students to reflect on the past few weeks and report how often they experienced things like “felt nervous and stressed,” for the Perceived Hopelessness subscale, and “Felt that you were on top of things,” for the Perceived Self-Efficacy subscale. Students responded to these subscales using a 5-point Likert-type scale ranging from 1 (never) to 5 (very often). Evidence for the reliability and validity of these subscales has been provided in previous research (Roberti et al., 2006; Liu et al., 2020) and internal consistency for Perceived Helplessness (α = 0.80) and Perceived Self-Efficacy (α = 0.71) subscales have been found to be good, with a sample of adolescents (Liu et al., 2020). In the present study, Cronbach’s alpha was 0.77 and ordinal alpha was 0.79 for Optimism; for Perceived Helplessness Cronbach’s alpha was = 0.84 and ordinal alpha was 0.85; and for Perceived Self-Efficacy, Cronbach’s alpha was 0.73 and ordinal alpha was 0.74.

School Functioning
To assess two aspects of students’ school functioning, students and teachers completed measures related to academics. Students responded to the 6-item Academic Goals Questionnaire (Roer et al., 1996), which assesses academic efficacy (e.g., “I can do even the hardest schoolwork if I try”) by responding to the question “How true is each statement for you?” on a 5-point Likert-type scale from 1 (not at all like me) to 5 (always like me). Evidence for validity and reliability of the Academic Goals Questionnaire (Roer et al., 1996; Midgley et al., 1998) has been demonstrated in previous research. For the current study, Cronbach’s alpha was 0.90 and ordinal alpha was 0.91 for the Academic Goals Questionnaire.

Teachers responded to the 7-item Academic Success subscale of the Academic Performance Rating Scale (APRS; DuPaul et al., 1991). Each item is rated on a different rating scale, for example “Estimate the accuracy of completed written math work” is rated on a 5-point scale representing a range of scores from 1 (0–49%) to 5 (90–100%) whereas the item “What is the quality of this child’s reading skills” is rated from 1 (poor) to 5 (excellent). The seven items are averaged to create a composite academic success score. Previous research has provided evidence of the internal consistency and validity of this measure when used with first to
sixth grade students (DuPaul et al., 1991). Cronbach’s alpha for the Academic Success subscale in this current study was 0.94 and ordinal alpha was 0.94.

RESULTS

The following section first describes the development of the Caring Student-Teacher Relationship (CSTR) measure and then reports results from a series of analyses conducted to examine evidence for the validity of the instrument (Zumbo, 2007) from 222 sixth and seventh grade students’ scores on this new scale. Specifically, we examined several facets of construct validity of the CSTR: 1) the dimensional structure and internal consistency of the CSTR, 2) evidence for convergent and discriminant validity of the CSTR, by examining associations between the CSTR and other constructs of teacher support, teacher burnout and mindfulness, classroom supportiveness, and student prosociality, well-being and school functioning, and 3) gender and grade differences in students’ scores on the CSTR.

Caring Student-Teacher Relationship Measure Development

In an effort to establish content validity from the outset of the measure development process, several recommended scale development steps were followed (Gehlbach and Brinkworth, 2011). First, a literature review of middle school student-teacher relationships and existing student self-report measures was conducted to identify key characteristics and potential scale items (e.g., Downer et al., 2015; Gallagher et al., 2019). One intention of the present study was to create a measure directly from the voices of middle school students, therefore in a second step we examined qualitative data derived from a previous study examining teacher-student relationships in early adolescence (Buote and Schonert-Reichl, 2004; Schonert-Reichl and Buote, 2006). Specifically, in this previous study, early adolescent students were asked to list five important adults in their school and then “List all the ways in which this person is important in your life.” In this study, the responses were coded in the following categories: 1) teaching instruction, 2) nurturing interactions, 3) positive characteristics about the person, and 4) other (not able to code). Given the burgeoning research on the importance of responsive and attuned student-teacher interactions (Wentzel, 1997; Braun et al., 2019) and research on the importance of responsive and attuned student-teacher interactions and caring, compassionate teacher characteristics (see Table 1 for items). Given that students may have positive relationships with some teachers and negative ones with others (Raufelder and Hoferichter, 2015), to ensure validity, this measure asked students to think of a specific teacher (i.e., the current teacher in the study) when responding to the items, rather than teachers in general (Raufelder et al., 2016). Students completed this scale using a 5-point Likert-type scale ranging from 1 (not at all true) to 5 (very true).

Distributions and Intercorrelations of Items on the CSTR

To examine whether this population of middle school students exhibited variability on the CSTR, we examined the means and standard deviations for each item on the scale (see Table 2). Results indicated there was satisfactory variability reported on the items of the CSTR as well as acceptable skewness (<2.0) and kurtosis (<4.0) for each item (Watkins, 2018).

We also examined inter-item correlations of the CSTR using the polychoric correlation matrix, which is recommended for ordinal data. Ordinal variables such as Likert-type items do not meet linearity and normality assumptions and can, consequently, negatively affect correlation coefficients and subsequent factor analysis results, therefore, the more robust polychoric correlation matrix is recommended (Fabrigar and Wegener, 2012; Gadermann et al., 2012). In order for factor analysis to be appropriate, a large number of correlations should exceed ±0.30 (Hair et al., 2010), which was the case for these data with correlations ranging from 0.50 to 0.80 (see Table 3 for intercorrelations). These findings indicate that items of the CSTR are highly related to each other (Cohen, 1992).

Factor Analysis

In order to explore the CSTR’s dimensionality and structural validity (Furr, 2011), an exploratory factor analysis (EFA) was conducted using participating students’ responses to the scale (see Table 1 for full scale). First, to ensure the data were appropriate for EFA, tests were conducted to ensure the correlation matrix was not random. Specifically, the Bartlett test of sphericity $\chi^2$ (120) = 3,179.99, $p < 0.001$ indicated the correlation matrix diverged significantly enough from the identity matrix therefore may be factorable. Moreover, the overall Kaiser-Meyer-Olkin (KMO) value (Kaiser, 1974) was above the recommended minimum of 0.50 (KMO = 0.95) indicating sampling adequacy for EFA.

Following this, we conducted a factor analysis of the 16-item CSTR using principal axis factoring as the estimation method with oblique (Promax) rotation (Fabrigar et al., 1999; Watkins, 2018). We chose oblique rotation given the high likelihood that the factors would be correlated (Watkins, 2018). We used EFA (instead of confirmatory factor analysis [CFA]) because the factor...
structure and latent variables of this newly created set of items has
not been previously examined. The EFA was conducted using the
lavaan package (Rosseel et al., 2017) and the psych package
(Revelle, 2018) in RStudio version 1.2.5042 (R Core Team,
2017) on polychoric correlation matrices to accommodate the
Likert-type data (Holgado–Tello et al., 2010; Özdemir et al.,
2019).

To assist in the determination of the number of factors to
retain, we conducted a principal component analysis on the
polychoric correlation matrix, followed by an inspection of
eigenvalues (Kaiser criterion) and scree plot. A parallel
analysis (Hayton et al., 2004) was also conducted. Data were
missing on one or more items for less than 2% of the sample (n
= 4). Given that this represented less than 10% of the data, mean
imputation was employed (Schumacker, 2015).

**TABLE 1 | Caring student-teacher relationship scale (CSTR).**

| How true is each statement for you? | Not at all true | A little true | Somewhat true | Pretty much true | Very true |
|------------------------------------|----------------|--------------|--------------|-----------------|---------|
| 1. My teacher helps me when I'm sad. | 1 | 2 | 3 | 4 | 5 |
| 2. My teacher is helpful. | 1 | 2 | 3 | 4 | 5 |
| 3. I can trust my teacher. | 1 | 2 | 3 | 4 | 5 |
| 4. My teacher takes care of me and the other students. | 1 | 2 | 3 | 4 | 5 |
| 5. My teacher gives me respect. | 1 | 2 | 3 | 4 | 5 |
| 6. My teacher listens to me and my problems. | 1 | 2 | 3 | 4 | 5 |
| 7. I can talk to my teacher. | 1 | 2 | 3 | 4 | 5 |
| 8. My teacher gives me time to cool down. | 1 | 2 | 3 | 4 | 5 |
| 9. My teacher supports me. | 1 | 2 | 3 | 4 | 5 |
| 10. My teacher treats me fairly. | 1 | 2 | 3 | 4 | 5 |
| 11. My teacher is always nice to everyone. | 1 | 2 | 3 | 4 | 5 |
| 12. My teacher respects people. | 1 | 2 | 3 | 4 | 5 |
| 13. My teacher is kind. | 1 | 2 | 3 | 4 | 5 |
| 14. My teacher is friendly. | 1 | 2 | 3 | 4 | 5 |
| 15. My teacher is calm. | 1 | 2 | 3 | 4 | 5 |
| 16. My teacher is caring. | 1 | 2 | 3 | 4 | 5 |

**TABLE 2 | Descriptive statistics of the CSTR.**

| M      | SD   | Variance | Skewness  |
|--------|------|----------|-----------|
|        |      |          | Statistic | SE   |
| 1. My teacher helps me when I'm sad. | 3.80 | 1.17 | 1.38 | -0.73 | 0.17 |
| 2. My teacher is helpful. | 4.33 | 0.82 | 0.68 | -1.09 | 0.16 |
| 3. I can trust my teacher. | 4.26 | 0.96 | 0.96 | -1.29 | 0.16 |
| 4. My teacher takes care of me and the other students. | 4.34 | 0.85 | 0.72 | -1.12 | 0.16 |
| 5. My teacher gives me respect. | 4.32 | 0.83 | 0.70 | -1.17 | 0.16 |
| 6. My teacher listens to me and my problems. | 4.14 | 0.98 | 0.95 | -1.01 | 0.16 |
| 7. I can talk to my teacher. | 4.14 | 1.01 | 1.03 | -1.08 | 0.16 |
| 8. My teacher gives me time to cool down. | 3.95 | 0.98 | 0.96 | -0.62 | 0.16 |
| 9. My teacher supports me. | 4.15 | 0.90 | 0.81 | -0.83 | 0.16 |
| 10. My teacher treats me fairly. | 4.31 | 0.85 | 0.73 | -1.34 | 0.16 |
| 11. My teacher is always nice to everyone. | 4.29 | 0.82 | 0.67 | -1.09 | 0.16 |
| 12. My teacher respects people. | 4.48 | 0.73 | 0.54 | -1.44 | 0.16 |
| 13. My teacher is kind. | 4.50 | 0.74 | 0.54 | -1.74 | 0.16 |
| 14. My teacher is friendly. | 4.56 | 0.67 | 0.45 | -1.68 | 0.16 |
| 15. My teacher is calm. | 4.36 | 0.82 | 0.67 | -1.34 | 0.16 |
| 16. My teacher is caring. | 4.49 | 0.75 | 0.57 | -1.52 | 0.16 |

Dimensionality and Internal Consistency of CSTR

Theory, eigenvalues, scree plot, and parallel analysis all suggested that two factors should be retained. The percent of total variance (of the 16 items) explained by the two rotated factors was 71% (40% by Factor A and 31% by Factor B). Criteria for establishing factor adequacy was established a priori, where pattern coefficients ≥0.40 were considered salient (i.e., practically and statistically significant) (Pedhazur and Pedhazur Schmelkin, 1991; Norman and Streiner, 2014). To honor simple structure (Thurstone, 1947), items with loadings >0.40 on more than one factor were to be rejected, however, there were no items that met this criterion. Finally, theoretically meaningful factors with a minimum of three items with adequate factor loadings and internal consistency >0.70 were retained. All 16 items loaded >0.40 on one (and only one) of the
TABLE 3 | Intercorrelations between items of the CSTR using the polychoric correlation matrix.

| Item | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| Item 1 | — | | | | | | | | | | | | | | |
| Item 2 | 0.63 | — | | | | | | | | | | | | | |
| Item 3 | 0.71 | 0.70 | — | | | | | | | | | | | | |
| Item 4 | 0.61 | 0.70 | 0.65 | — | | | | | | | | | | | |
| Item 5 | 0.66 | 0.71 | 0.66 | 0.72 | — | | | | | | | | | | |
| Item 6 | 0.75 | 0.68 | 0.63 | 0.63 | 0.71 | — | | | | | | | | | |
| Item 7 | 0.70 | 0.65 | 0.68 | 0.65 | 0.67 | 0.67 | 0.67 | 0.72 | — | | | | | | |
| Item 8 | 0.63 | 0.58 | 0.56 | 0.58 | 0.59 | 0.63 | 0.72 | — | — | 0.70 | — | | | | |
| Item 9 | 0.72 | 0.72 | 0.65 | 0.69 | 0.69 | 0.68 | 0.78 | 0.70 | 0.70 | — | | | | | |
| Item 10 | 0.70 | 0.70 | 0.63 | 0.71 | 0.77 | 0.71 | 0.76 | 0.69 | 0.77 | 0.70 | — | | | | |
| Item 11 | 0.57 | 0.63 | 0.55 | 0.62 | 0.61 | 0.58 | 0.57 | 0.53 | 0.64 | 0.67 | 0.67 | 0.74 | — | — | |
| Item 12 | 0.57 | 0.60 | 0.56 | 0.61 | 0.63 | 0.59 | 0.57 | 0.53 | 0.59 | 0.66 | 0.68 | 0.74 | 0.74 | — | |
| Item 13 | 0.60 | 0.67 | 0.61 | 0.60 | 0.66 | 0.59 | 0.64 | 0.60 | 0.67 | 0.69 | 0.76 | 0.80 | 0.82 | 0.82 | — |
| Item 14 | 0.57 | 0.66 | 0.58 | 0.59 | 0.65 | 0.56 | 0.61 | 0.55 | 0.63 | 0.67 | 0.72 | 0.78 | 0.82 | 0.78 | — |
| Item 15 | 0.52 | 0.60 | 0.54 | 0.59 | 0.57 | 0.55 | 0.55 | 0.50 | 0.59 | 0.59 | 0.73 | 0.73 | 0.75 | 0.72 | 0.72 |
| Item 16 | 0.59 | 0.64 | 0.63 | 0.62 | 0.68 | 0.63 | 0.59 | 0.59 | 0.66 | 0.67 | 0.75 | 0.79 | 0.82 | 0.79 | 0.74 |

*p < 0.01.

TABLE 4 | Items and factor loadings of the CSTR.

| Item | Factor loading |
|------|----------------|
|      | A | B |
| Teacher support and attunement | | |
| I can talk to my teacher. | 0.89 | -0.04 |
| My teacher helps me when I’m sad. | 0.86 | -0.04 |
| My teacher supports me. | 0.83 | 0.06 |
| My teacher listens to me and my problems. | 0.80 | 0.03 |
| My teacher treats me fairly. | 0.74 | 0.16 |
| My teacher gives me time to cool down. | 0.74 | 0.03 |
| I can trust my teacher. | 0.71 | 0.09 |
| My teacher gives me respect. | 0.68 | 0.19 |
| My teacher takes care of me and the other students. | 0.65 | 0.18 |
| My teacher is helpful. | 0.64 | 0.22 |
| Caring teacher qualities | | |
| My teacher respects people. | 0.00 | 0.88 |
| My teacher is kind. | 0.08 | 0.85 |
| My teacher is friendly. | 0.06 | 0.83 |
| My teacher is calm. | 0.00 | 0.83 |
| My teacher is caring. | 0.10 | 0.82 |
| My teacher is always nice to everyone | 0.09 | 0.77 |

Note: N = 222. The extraction method was principal axis factoring with an oblique (Promax with Kaiser normalization) rotation. Factor loadings above 0.40 are in bold.

Convergent and Discriminant Validity Evidence for the CSTR

We conducted a series of correlations between the two CSTR subscales and a battery of measures, to examine convergent and discriminant validity. The results from an alternative, one-factor model (TLI = 0.86; RMSEA = 0.13; RMSR = 0.06) suggest that the two-factor model is preferable.

A subscale was created for each factor by calculating the unweighted mean for the items loading above 0.40 on that factor. The first 10 items loaded onto the first latent variable, Factor A (factor loadings ranged from 0.64 to 0.89) and six items (observed variables) loaded strongly on a second latent variable, Factor B (loadings ranged from 0.77 to 0.88) (see Table 4). Given the complexity of each factor, a team of SMEs were again consulted and surveyed for their suggestions for factor labels. First, a qualitative feedback discussion was conducted, where all SMEs provided their insight into the themes that emerged from each factor. Second, a list of preliminary factor names was created from this discussion and distributed to each SME, with a request to rank each factor name in order of preference. Following this iterative process, two factor names emerged: Teacher Support and Attunement (Factor A) and Caring Teacher Qualities (Factor B).

Following from the principal components and factor analyses, which indicated two factors of the CSTR, internal consistency was calculated on scores of the subscales. Cronbach’s alpha was 0.94 and ordinal alpha was 0.95 for Teacher Support and Attunement. For Caring Teacher Qualities, Cronbach’s alpha was 0.94 and ordinal alpha was 0.95.

We also calculated the corrected item-total correlations based on the polyserial correlation matrix and the ordinal alphas-if-item-deleted (Table 5) for both subscales. The results indicated that in the present sample all items related highly to the corrected total subscales; Teacher Support and Attunement ranged from 0.70 to 0.85 and Caring Teacher Qualities ranged from 0.74 to 0.87. Furthermore, deleting any of the items would not improve the reliability of either subscale. These findings indicate satisfactory internal consistency of each subscale of the CSTR.
TABLE 5 | Corrected item total correlations, and ordinal alpha-if-item-deleted of items of CSTR.

| Teacher Support and Attunement                                      | Corrected item-total correlation | Ordinal alpha-if-item-deleted |
|--------------------------------------------------------------------|----------------------------------|------------------------------|
| 1. My teacher helps me when I’m sad.                              | 0.78                             | 0.95                         |
| 2. My teacher is helpful.                                          | 0.76                             | 0.95                         |
| 3. I can trust my teacher.                                         | 0.71                             | 0.95                         |
| 4. My teacher takes care of me and the other students.             | 0.76                             | 0.95                         |
| 5. My teacher gives me respect.                                    | 0.79                             | 0.95                         |
| 6. My teacher listens to me and my problems.                       | 0.77                             | 0.95                         |
| 7. I can talk to my teacher.                                       | 0.80                             | 0.96                         |
| 8. My teacher gives me time to cool down.                          | 0.70                             | 0.95                         |
| 9. My teacher supports me.                                         | 0.85                             | 0.95                         |
| 10. My teacher treats me fairly.                                   | 0.82                             | 0.95                         |

| Caring Teacher Qualities                                          | Corrected item-total correlation | Ordinal alpha-if-item-deleted |
|-------------------------------------------------------------------|----------------------------------|------------------------------|
| 11. My teacher is always nice to everyone.                        | 0.81                             | 0.94                         |
| 12. My teacher respects people.                                   | 0.85                             | 0.94                         |
| 13. My teacher is kind.                                           | 0.87                             | 0.94                         |
| 14. My teacher is friendly.                                       | 0.83                             | 0.94                         |
| 15. My teacher is calm.                                           | 0.74                             | 0.95                         |
| 16. My teacher is caring.                                         | 0.81                             | 0.94                         |

TABLE 6 | Evidence of convergent and discriminant validity of the CSTR.

| Teacher support and attunement                                      | Caring teacher qualities         |
|--------------------------------------------------------------------|----------------------------------|
| Teacher support and attunement                                      | —                                | 0.78**                        |
| Teacher support, SEC, and burnout                                  | 0.78**                           | —                              |
| Student report of teacher support (CASSS)                          | 0.80**                           | 0.67**                        |
| Student report of teacher personal support (CLM)                   | 0.86**                           | 0.63**                        |
| Student report of teacher SEC (TSEC)                               | 0.73**                           | 0.70**                        |
| Teacher report of burnout (MBI)**                                  | −0.40**                          | −0.50**                       |
| Classroom context and prosociality                                 | 0.34**                           | 0.26**                        |
| Student report of classroom supportiveness                         | 0.33**                           | 0.23**                        |
| Student report of prosocial goals (social goals scale)             | 0.32**                           | 0.19**                        |
| Student report of altruism                                        | 0.32**                           | 0.19**                        |
| Teacher report of student SEC (TSCRS)                              | 0.22**                           | 0.16**                        |
| Well-being                                                         |                                   |                               |
| Student report of optimism (resiliency inventory)                  | 0.36**                           | 0.26**                        |
| Student report of perceived self-efficacy (PSS-10)                 | 0.30**                           | 0.24**                        |
| Student report of perceived helplessness (PSS-10)                  | −0.10                            | −0.11                         |
| School functioning                                                 |                                   |                               |
| Student report of academic efficacy (academic goals questionnaire)  | 0.47**                           | 0.29**                        |
| Teacher report of academic success (APRS)                          | 0.17*                            | 0.06                          |
| Teacher ratings of student-teacher relationship and mindfulness    |                                   |                               |
| Teacher report of student-teacher relationship closeness (STRS)     | 0.24**                           | 0.13                          |
| Teacher report of student-teacher relationship conflict (STRS)      | −0.17**                          | −0.15**                       |
| Teacher report of intrapersonal mindfulness in teaching*           | 0.22**                           | 0.18**                        |
| Teacher report of interpersonal mindfulness in teaching*           | 0.19**                           | 0.28**                        |

For analyses between teacher self-report and student-rated data, student data was aggregated within each classroom to create a classroom level indicator.

*p < 0.05.

**p < 0.01.

discriminant validity evidence. These associations are presented in Table 6. In terms of missing data for the validity constructs, participant data were retained if they responded to at least 80% of the items of a scale. Any missing data for the correlations was treated with listwise deletion.

As hypothesized, students’ scores on both the Teacher Support and Attunement and Caring Teacher Qualities subscales were positively and significantly correlated with students’ reports on other measures of teacher support and teacher SEC, and the effect sizes were large (>0.60). Cohen (1992) suggests that correlations
of 0.10, 0.30, and 0.50 can be interpreted as small, medium, and large effect sizes respectively. Students’ scores on both subscales were aggregated at the teacher level in order to compare them to teachers’ self-reports of their burnout. Students’ scores on the Teacher Support and Attunement and Caring Teacher Qualities subscales were both significantly and negatively related to teachers’ self-reports of their feelings of burnout, with medium to large effect sizes.

As hypothesized, students’ scores on the two CSTR subscales were also positively and significantly related to student self-report measures of classroom supportiveness and student and teacher reported measures of prosociality (i.e., altruism, prosocial goals, SEC), with small to medium effect sizes. Similarly, the CSTR subscales showed significant positive correlations with students’ reports of optimism and self-efficacy, with medium effect sizes, but were not significantly correlated with students’ perceived helplessness. Finally, the two CSTR subscales were significantly and positively correlated with students’ reports of academic efficacy, with medium effect sizes. The Teacher Support and Attunement subscale showed significant positive correlations with teachers’ reports of students’ academic success, with small effect sizes, but the Caring Teacher Qualities was not significantly related to academic success.

Students’ scores on the Teacher Support and Attunement subscale were also positively and significantly related to teacher reports of student-teacher closeness and significantly and negatively related to conflict, with small to medium effect sizes. Students’ scores on Caring Teacher Qualities were significantly and negatively related to teacher-rated conflict but not significantly correlated with teacher-rated closeness (see Table 6).

Students’ scores on both subscales were aggregated at the teacher level in order to compare them to teachers’ self-reports of their mindfulness in teaching. Results indicated significant and positive correlations between both subscales and teachers’ reports of Intrapersonal Mindfulness (i.e., mindful habits within the self) and Interpersonal Mindfulness (i.e., mindful interactions between teacher and student), with small to medium effect sizes.

**Gender and Grade Differences**

To examine gender and grade differences in students’ responses to CSTR, we performed a 2 (Gender) x 2 (Grade) analysis of variance (ANOVA) for each subscale of the CSTR. Confidence intervals (CIs) of effect sizes ($\eta_p^2$) are provided, as they are favored over retrospective power analyses and can provide additional information about significance of findings (Cohen, 1990; Hoenig and Heisey, 2001; Levine and Ensom, 2001; Nakagawa and Foster, 2004). 90% CI are recommended when using $\eta_p^2$ and are equivalent to a 95% CI around Cohen’s $d$, thus were calculated using the effectsize package (Ben-Shacker et al., 2021) and esc package (Lüdecke et al., 2019) in R Studio version 1.2.5042 (R Core Team, 2017). Main effects for both gender and grade were not significant for either Teacher Support and Attunement (gender, $F\ [1,216] = 1.69, p = 0.20, \eta_p^2 = 0.01, 90\% \text{ CI} [0.00, 0.04]$; grade, $F\ [1,216] = 2.71, p = 0.10, \eta_p^2 = 0.01, 90\% \text{ CI} [0.00, 0.05]$) or Caring Teacher Qualities (gender, $F\ [1,216] = 0.12, p = 0.73, \eta_p^2 = 0.001, 90\% \text{ CI} [0.00, 0.02]$; grade, $F\ [1,216] = 2.15, p = 0.14, \eta_p^2 = 0.01, 90\% \text{ CI} [0.00, 0.04]$). Interaction effects were also nonsignificant for both subscales; Teacher Support and Attunement ($F\ [1,216] = 1.45, p = 0.23, \eta_p^2 = 0.01, 90\% \text{ CI} [0.00, 0.04]$), Caring Teacher Qualities ($F\ [1,216] = 1.46, p = 0.23, \eta_p^2 = 0.01, 90\% \text{ CI} [0.00, 0.04]$). CIs that include zero provide additional support for the non-significant conclusions.

An important next step in measure validation is examining measurement invariance (Meredith, 1993; Vandenberg and Lance, 2000) to determine if the same underlying construct is being measured across groups. However, for a multi-group CFA, as a general rule, it is recommended that there be 100 participants in each group (Kline, 2015). An *a priori* power analysis was also conducted using the *semPower* package (Moshagen and Erdofelder, 2016) in R Studio version 1.2.5042 (R Core Team, 2017), which indicated that at least 88 participants would be needed in each group (i.e., 88 boys, 88 girls) to achieve 80% power to detect small differences at $\alpha = 0.05$. Moreover, to follow an EFA with a CFA, the CFA should be conducted on a sample independent from the initial EFA to avoid model overfitting (Matsunaga, 2010; Fokkema and Greiff, 2017). Given this and the limited sample size we were to partition the data into two samples, measurement invariance analyses were not conducted for the present study.

**DISCUSSION**

The present study examined the factor structure, psychometric properties, and evidence for validity of a new measure of middle school students’ perceptions of caring student-teacher relationships, the CSTR. There is a growing need for validated measures that assess middle school students’ perspectives of student-teacher relationships. This is particularly true given the limited research that incorporates students’ perceptions of caring dimensions in these relationships (Ahnert et al., 2012) and the frequent disparity found between early adolescents’ perceptions and teachers’ perceptions in the classroom (Koepke and Harkins, 2008; Rickert et al., 2020). Moreover, the majority of scales currently being used in research to assess middle school students’ perceptions of student-teacher relationships frequently employ unvalidated sets of items, focus on broad teacher support rather than a thorough look at caring aspects of these relationships (Johnson et al., 1985; Ricard and Pelletier, 2016), and/or are not developed from the voices of students (Brinkworth et al., 2017).

The pattern of results in the present study offers preliminary evidence that the CSTR has strong psychometric properties and has utility for shedding light on student-teacher relationships in early adolescence. Specifically, our results revealed a two-dimensional factor structure for the CSTR, highlighting two important components of student-teacher relationships: Support and attunement within the student-teacher relationship (Teacher Support and Attunement) and caring qualities of the teacher themselves (Caring Teacher Qualities). This aligns with previous research that shows the importance of not only the nurturing interactions between teachers and their students, but also teachers’ own characteristics they bring to the relationship (Jennings and Greenberg, 2009; Coliaianne et al., 2020). Existing measures of teacher support typically ask students
to report on broader aspects of the relationship, such as how much a teacher likes them (e.g., “My teacher likes me as much as he/she likes other students”; Johnson et al., 1985) or conflict/closeness (e.g., “I easily have quarrels with my teacher”) in the relationship (Koomen and Jellesma, 2015; Longobardi et al., 2016). The CSTR, however, asks students to reflect on the specific caring and responsive behaviors and qualities their teacher exhibits (e.g., “My teacher listens to me and my problems,” “My teacher respects people,” “My teacher gives me time to cool down”).

Furthermore, analyses revealed high internal consistency and acceptable variability of the responses on the two subscales on the CSTR. In addition, the results supported our hypotheses, that the correlations between the CSTR and other measures of teacher support and teacher SEC and burnout would have the largest effect sizes, followed by moderate associations with students’ prosociality, well-being, and school functioning, and small associations with teachers’ ratings of relationship quality and self-reports of mindfulness. Given that the convergent connections had larger effect sizes than the discriminant relations, this provides some preliminary support for construct validity of the CSTR subscales.

First, the findings of large correlations between the CSTR subscales and other teacher support scales indicates that this new scale is comparable to other measures of teacher support but is not redundant. This provides evidence for convergent validity and supports the contention that the CSTR may indeed offer additional, unique information about middle school student-teacher relationships beyond what is currently being assessed in the field.

This study also included correlational analyses between the CSTR and teachers’ self-reports of burnout, specifically a composite of emotional exhaustion and depersonalization. Results indicated moderate significant and negative correlations between teacher burnout and student reports of Teacher Support and Attunement and Caring Teacher Qualities. Due to the cross-sectional nature of this study, we cannot discern which direction this relationship occurs in – whether teacher burnout leads to less teacher attunement, support, and caring, or whether a lack of support and attunement in the student-teacher relationship has detrimental, reciprocal effects on the teacher, causing feelings of depersonalization and emotional exhaustion. Some previous longitudinal research, however, has provided some support for the former explanation. For instance, research has supported the “burnout cascade” described in Jennings and Greenberg’s “Prosocial Classroom” (2009), in that higher teacher burnout earlier in the school year has been shown to lead to teachers feeling less connected to their students (Aloe et al., 2014; Dicke et al., 2014) and has been associated with poorer student well-being at the end of the year (Braun et al., 2020). These findings support the notion that valuing and fostering teachers’ well-being not only has benefits for teachers but also has positive, downstream effects on student well-being and school success (Jennings and Greenberg, 2009; Jennings et al., 2017). Future research would benefit from a longitudinal investigation of the relation between the CSTR and teacher burnout.

The findings of significant associations between middle school students’ perceptions of caring student-teacher relationships and students’ own prosociality, well-being, and school functioning, and perceptions of classroom support provided additional evidence for convergent and discriminant validity. Moreover, this study aligns with previous research that has shown strong correlations between supportive student-teacher relationships and students’ prosociality, particularly during middle school (Wentzel et al., 2010). In addition, this study corroborates previous findings of small to moderate relations between student-teacher relationships and students’ resiliency (i.e., optimism, self-efficacy) (Pallini et al., 2019), academic functioning (Engels et al., 2016; Archambault et al., 2017), and classroom support (Brown et al., 2010; Cipriano et al., 2019).

Next, the finding of weak correlations between the CSTR and teacher reports of closeness and conflict in the student-teacher relationship is noteworthy. These findings align with previous research that have reported weak or non-significant correlations between early adolescents’ and teacher or other perspectives of caregiver relationships (Zee and Koomen, 2017), demonstrating that early adolescent students often have a unique perception of their relationships that is less accessible to other raters. In contrast to previous research that has shown students and teachers are more likely to agree on the conflict in the relationship than the closeness (Plante and Stuhlman, 2004; Zee and Koomen, 2017), the findings of the current study indicate the opposite: a higher correlation between student perceptions of Teacher Support & Attunement and teacher-rated closeness than with conflict. There were no differences in magnitude of correlations between closeness and conflict with Caring Teacher Qualities. This finding may be due to the CSTR measuring something more distinct from the STRS, than other measures that have been previously compared to the STRS. Moreover, the CSTR only includes positively worded items, which may be more closely related to closeness than conflict. It is also notable that the factor “Caring Teacher Qualities” was not significantly correlated to teacher-rated closeness but was significantly and negatively correlated to teacher-rated conflict. This finding supports previous research that has found that teachers’ own characteristics (e.g., stress, self-efficacy, emotional support) account for significant variance in their perceptions of conflict in their relationships with students, over and above that which is accounted for by their reports of students’ problem behaviors (Hamre et al., 2008).

Additionally, the findings of low but significant, positive correlations between CSTR subscales and teacher self-reports of interpersonal and intrapersonal mindfulness in teaching are notable. These results reflect previous research by Rickert et al. (2020) that found that teachers’ self-reports of their mindful experiences were not as often reflective of their outward expressions of mindful behaviors, as reported by students and trained observers. Although the CSTR does not explicitly claim to measure teacher mindfulness, many characteristics of mindful teaching (i.e., calm, clear, kind; Rickert et al., 2020) were included in the items as they were considered important for caring and attuned student-teacher relationships (e.g., “my teacher is calm,” “My teacher gives me time to cool down”). As Rickert et al. (2020)
mention in their discussion, the finding of a relation between teacher reported mindfulness and students’ perceptions of a mindful and/or caring student-teacher relationship supports the burgeoning research that shows fostering teachers’ mindfulness has the potential to improve relationships and climate in the classroom (Eccles and Roeser, 2011; Braun et al., 2019).

With regard to the third aim and final piece of validity evidence, no gender or grade differences were found for either subscale of the CSTR. This finding regarding gender is at odds with some of the research showing boys and girls differ in their relationships with their teachers, namely around closeness and conflict, as measured by the teachers (Pianta, 2001; Koepke and Harkins, 2008; Zee and Koomen, 2017) and some research on students’ perceptions of teacher support (Wentzel et al., 2010). This finding does agree with some previous research that has found no gender difference in students’ perceptions of teacher mindfulness – calm, clarity, and kindness – in the student-teacher relationship (Colaianne et al., 2019), which are also aspects assessed in the new CSTR measure. These findings highlight the importance of investigating students’ own perceptions of their relationships with their teachers as they often differ from the perspectives of the teachers. For instance, some research has demonstrated that teachers, particularly middle school teachers, may have inherent and differing biases towards each gender of student (Saft and Pianta, 2001), which may contribute to their contrasting evaluations of the quality of their relationships with students. In particular, teachers tend to both report relationships with boys as more conflictual (Koepke and Harkins, 2008) and view boys as more aggressive (Miller et al., 2009; Spilt et al., 2010).

It has been proposed, however, that this could be due to the finding that boys are more likely to express aggression overtly (e.g., physically; Noakes and Rinaldi, 2006), whereas aggression amongst girls is more often expressed in covert verbal or social ways (Spilt et al., 2010), which may be less salient to an observer. Future validation studies of the CSTR should include tests of measurement invariance (Vandenberg and Lance, 2000), particularly as it pertains to gender, to investigate if the scale functions and is interpreted the same way for every gender identity.

The finding of no significant main effects for grade for either subscale is in contrast with previous research that shows a decline in closeness and quality of student-teacher relationships as students progress from elementary to middle and secondary school (Reddy et al., 2003; Eccles and Roeser, 2011). This relationship, however, has typically been investigated through teachers’ reports of the student-teacher relationship, whereas there is a scarcity of investigations and incongruence of findings regarding grade differences of student perceptions of student-teacher relationships (Malecki and Demaray, 2002; Downer et al., 2015). Moreover, the majority of this previous research has investigated changes in student-teacher relationships during transitions from elementary schools to middle or secondary schools (Eccles et al., 1993), which comes with many contextual and pedagogical changes (e.g., more teachers, larger classes), whereas this study only compared across two grades within middle school. Moreover, this study involved combined grade classrooms, which incorporates both sixth and seventh grade students within the same class. This may have contributed to the small effect size found for grade-level differences, given that both grades shared the same classroom teacher. However, future studies should conduct measurement invariance analyses for grade and continue to investigate the utility of the CSTR longitudinally and across a wider range of grades.

**Strengths and Limitations**

The results of this study provide some initial support for a new psychometrically sound instrument that can provide new insight into middle school students’ perceptions of caring student-teacher relationships. The findings suggest that the CSTR is an appropriate measure to use with middle school students and there is some preliminary evidence that students’ perceptions of attunement, support, and caring from their teachers are related to better classroom support and student prosociality, well-being, and school functioning. The results also support previous research by demonstrating that early adolescents have a unique perspective to offer when evaluating relationships in the classroom and these perceptions may have an important impact on their own social, emotional, and academic well-being.

One primary strength of this study is the content validity and developmental appropriateness of the items in the measure. First, the original pool of items was developed using language generated from middle school students themselves and then reviewed and modified by a team of SMEs. Second, the majority of items asked students to report on their own interpretations and experiences with teachers, rather than asking them to report on the perspectives of their teacher or classmates (e.g., “My teacher has close relationships with students in this class”) which may be a challenging cognitive task for this age group. To ensure variability and the inclusion of students’ perceptions of the wider classroom context, some items went beyond students’ own experiences, but were deemed easily observable (“My teacher is always nice to everyone,” “My teacher respects people”).

Another strength of this study includes the multiple methods used to investigate validity evidence for this measure, including student self-report measures, teacher-ratings of students, and teacher self-report measures. In this study, we included many constructs that other investigations of comparable scales also used for convergent and discriminant validity such as academic efficacy (Rickert et al., 2019) and prosociality (Koomen and Jellesma, 2015).

Furthermore, this study took place midway through the school year, which ensured students and teachers had sufficient time together prior to data collection to establish their relationships and reliably report on them. There is also moderate generalizability of the findings due to the relatively large and diverse sample of students, representative of Western Canada. A number of students did not have complete data for the CSTR and thus were excluded from analyses. A comparison between the excluded students and the participating sample revealed no significant demographic (i.e., gender, family composition, first language) differences, however, it is possible the excluded...
students may have provided different responses to the CSTR. Thus, there is a small group of students for whom we do not know if the current findings apply.

It is important to highlight the unique context of the present study, both as a strength and limitation. First, most measures of students’ perceptions of their student-teacher relationships have been developed within an American context. This study provides insight into the context of middle schools in Canada and developed a measure particularly relevant to this setting. Second, as mentioned, BC where this study took place, has a dedicated focus on fostering students’ social responsibility, promoting SEL, and creating caring schools. Moreover, the teachers that participated in this study had voluntarily signed up for this research about a social and emotional learning program. Therefore, the context of the participating schools and the teachers and students may be particularly primed for caring student-teacher relationships. Thus, it is possible that the factor structure and scores on the CSTR, as well as the associations with gender, grade, and other SEL constructs, could be different in other jurisdictions with a lesser focus on these qualities.

An additional limitation of this study is the cross-sectional and correlational design, which limits some of the interpretations that can be made from these findings, such as predictive validity, stability of scores (e.g., test-retest reliability), or development of students’ perceptions over time. For example, the findings indicate significant relations between students’ perceptions of teacher support, attunement, and caring to measures of classroom supportiveness as well as student prosociality, well-being, and school functioning, however, longitudinal studies are needed to infer any causal relationships among these constructs. Despite these limitations, this study provides some preliminary support for the reliability and validity of the CSTR for use with middle school students. In doing so, this study reinforces the need to continue to include student voices and perceptions when studying relationships in the classroom.

**Future Directions and Educational Implications**

Validation is considered an ongoing, iterative process (Hubley and Zumbo, 2011), therefore additional validation research on the CSTR is needed, particularly with a broader age range, more diverse samples, and in the context of longitudinal research. For instance, the population of BC consists predominantly of people who report their ethnic origin as European or Asian, with smaller proportions of those who identify as Black, Indigenous Peoples, and Latinx. Given the systemic oppression and disparate experiences of underrepresented groups, it is essential to examine this measure with additionally diverse samples, particularly with a greater proportion of Black, Latinx, and Indigenous Peoples populations. Moreover, it would be important to cross-validate this EFA with a confirmatory factor analysis and additional diverse samples.

In addition, we did not have sufficient power to partition our dataset and conduct measurement invariance analyses (i.e., Multiple Group Confirmatory Factor Analysis [MGCFA]) on a subsample that was independent from that which was used for the EFA. Future studies utilizing the CSTR should further explore validity evidence of this tool using both confirmatory factor analyses and measurement invariance analyses. Given the novel aspect of this measure and the paucity of available measures that assess middle school students’ perceptions of their relationships with their teachers, it would also be valuable to investigate the cognitive processes students utilize when responding to the CSTR (i.e., through think-aloud protocols) (e.g., Gadermann et al., 2011).

The current findings provide support for the importance of student-teacher relationships in middle school and provides a psychometrically sound tool for assessing students’ perceptions of caring dimensions of these relationships. Having such a measure is not only valuable for theoretical investigations, but it may also prove useful for schools looking to internally evaluate their own school cultures. Furthermore, although a handful of measures exist that assess students’ perspectives of broad teacher support (Ricard and Pelletier, 2016; Brinkworth et al., 2017), none to date focus on early adolescents’ perceptions of specific aspects of teacher caring and attunement. This type of in-depth measure may be informative for interventions and teacher professional development that aim to improve student-teacher relationships and classroom contexts. Specifically, rather than only measuring teachers’ perceptions of the impact of such interventions, this measure provides a means through which to investigate how SEL interventions may change students’ perceptions of their relationships with their teachers. Given the common discrepancy between teacher and student perceptions of their relationships (Zee and Koomen, 2017; Prewett et al., 2019), this is an important perspective to evaluate in intervention research. Moreover, some research has shown the effectiveness of some of the existing, broad teacher support measures in predicting academic-related student outcomes (Wang and Eccles, 2012; Scales et al., 2020), however, fewer have shown strong relations with adolescent students’ social and emotional outcomes (Brinkworth et al., 2017; Colaianne et al., 2020). Given the growing need to foster current and future early adolescents’ social and emotional competencies in school (Greenberg et al., 2017), there may be particular relevance in being able to assess the qualities of the student-teacher relationship that are most related to these students’ outcomes, particularly from the unique perspective of the students themselves.

**DATA AVAILABILITY STATEMENT**

The datasets presented in this article are not readily available because of the nature of this research and age of participants, participants of this study did not agree for their data to be shared publicly. Requests to access the datasets should be directed to JW, jenna.whitehead@ubc.ca.
ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Clinical Research Ethics Board at the University of British Columbia. Written informed consent to participate in this study was provided by the participants’ legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

All authors contributed to the study conception and design. Material preparation, data collection, and analysis were performed by JW and KS. The first draft of the manuscript was written by JW and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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