



# What Fosters School Connectedness? The Roles of Classroom Interactions and Parental Support

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## Abstract

Although research has identified the impact of school connectedness on a variety of outcomes for adolescents, much less work has focused on identifying its precursors. This study examined the relative influences of classroom interactions and parental support on elements of school connectedness among a sample of 4838 students ( $M_{\text{age}} = 15.84$ ,  $SD = 0.29$ ; 49.1% female) in the United States from the Programme for International Student Assessment (PISA) 2018 data. The results showed that three domains of classroom interactions (i.e., classroom management, instructional support, and emotional support) and parental support played unique roles in predicting school connectedness (i.e., teacher support and school belonging). Specifically, classroom management positively predicted both teacher support and school belonging; instructional support, especially directed instruction, positively predicted teacher support; emotional support was unrelated to teacher support and school belonging. Parental support positively predicted school belonging, but not teacher support. Overall, these findings highlight the roles of both teachers and parents in providing developmentally appropriate support to facilitate school connectedness.

**Keywords** School connectedness · Classroom interactions · Parental support · Adolescent · Programme for International Student Assessment (PISA)

## Introduction

Adolescents spend much of their waking hours in school settings (Monahan et al., 2010; Rose et al., 2018). Given the critical impact of school, there is increasing interest in understanding the role of school connectedness in adolescent development. An extensive body of research has found that school connectedness is a key factor for students' academic (Bostwick et al., 2022; Niehaus et al., 2012), behavioral (Chapman et al., 2013), and psychological development (Resnick et al., 1997). For example, a systematic review noted the significant impact of school connectedness on reducing risk-taking behaviors for adolescents (Chapman et al., 2013). Additionally, a recent study found that helping high school students to feel included in school may promote success in navigating academic setbacks and challenges (Bostwick et al.,

2022). Although research has examined how school connectedness predicts a variety of outcomes, much less work has focused on identifying its precursors (Allen et al., 2016; Hernández et al., 2017), which may limit the possibility to design targeted interventions in this area. Hence, more work is needed to gain a better understanding of how school connectedness could be fostered. Available studies have highlighted that school-level (e.g., school size, McNeely et al., 2002; school diversity, Graham et al., 2022) and classroom-level (e.g., classroom management; Waters et al., 2010) factors are essential in facilitating connectedness to school. Despite the critical role of teachers and the importance of classroom interactions (Allen et al., 2016, 2021; McNeely et al., 2002), few empirical studies have fully explored specific elements of classroom interactions in fostering school connectedness. Available studies have supported that elements of classroom interactions (e.g., emotional support) positively predicted adolescents' school connectedness (e.g., Chiu et al., 2012). Moreover, teachers and parents can independently and jointly facilitate students' school connectedness (Allen et al., 2016; Slaten et al., 2016). Several studies found that parental support or involvement was strongly associated with school connectedness for adolescents in middle and high school (Allen

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et al., 2018; Kuperminc et al., 2008). Therefore, the primary goal of the present study was to investigate how specific elements of classroom interactions, after taking the effect of parental support into account, contributed to school connectedness among a group of adolescents in the United States, using data from the Programme for International Student Assessment (PISA) 2018.

### School Connectedness in Adolescence

School connectedness is widely defined as “the belief by students that adults in the school care about their learning and about them as individuals” (Wingspread Declaration on School Connections, 2004, p. 233). Multiple studies have argued that school connectedness is a multidimensional construct (Chung-Do et al., 2015; García-Moya et al., 2019; Peng et al., 2023), but most studies to date have measured school connectedness in a unidimensional way by using one composite score or focusing on one aspect of school connectedness (e.g., school belonging; Allen et al., 2018), which oversimplifies the construct. Although there is a lack of consensus on terminology and scope, two basic elements of school connectedness have been identified (Barber & Schluterman, 2008). First, the relational component refers to the connection or bond that adolescents experience with socialization agents; second, the autonomy component refers to the extent to which adolescents feel that their individuality is validated and supported by their socialization agents. Therefore, based on this framework and previous research (Barber & Schluterman, 2008; García-Moya et al., 2019; McNeely et al., 2002), two key elements of school connectedness were identified in the current study: school belonging as a relational component that refers to the connection between adolescents and schools, and teacher support as an autonomy component that refers to the extent to which adolescents feel that they are supported by teachers in their learning.

School connectedness may be particularly important for adolescents as they engage with key developmental tasks and experience a variety of physical, cognitive, and social changes (Allen et al., 2018; Erikson, 1968; Graham et al., 2022). Specifically, during the transition from middle to late adolescence, individuals experience increased independence from their families and make choices that can have a long-lasting impact throughout the lifespan, such as decisions about education or vocational training (Mason et al., 2009; Zarrett & Eccles, 2006). In addition, various changes related to biological, psychological, and social functioning increase risks for academic, emotional, behavioral, and social problems (Mason et al., 2009). For example, during high school, adolescents often report significant declines in academic performance, interest, and self-perceptions of ability, and increased risks for academic failure and school

dropout (Wigfield et al., 2006; Zarrett & Eccles, 2006). Moreover, sexual behaviors and substance use increase dramatically from middle to late adolescence, and are accompanied by risks of teenage pregnancy, injury, illness, and death (Mason et al., 2009; Zarrett & Eccles, 2006). Successful navigation of these challenges depends on developmentally appropriate support and settings that enable adolescents to explore and interact with these challenges (Zarrett & Eccles, 2006). In other words, school connectedness during this period cannot only protect adolescents from risky behaviors (Chapman et al., 2013) but also help them to better navigate academic challenges (Bostwick et al., 2022) and facilitate engagement with critical developmental tasks (e.g., social identity formation, transition to adulthood; Allen et al., 2022).

Nevertheless, school connectedness decreases dramatically and disconnection from schools has been frequently reported during adolescence (e.g., Allen et al., 2018; Chapman et al., 2013), which may hinder successful transition into adulthood. One possible explanation for this disconnection is the potential mismatch between adolescents’ developmental needs and the opportunities provided by their social environments (e.g., home and school; Alley, 2019; Eccles et al., 1993). Compared to middle schools, high schools are typically larger and more bureaucratic and there is often little opportunity for students to connect to teachers or other adults, which further undermines motivation and involvement of many students (Wigfield et al., 2006). In addition, school connectedness may vary based on student characteristics such as gender, race, and cultural background. Previous studies showed that males (e.g., Niehaus et al., 2012), students from racial minority groups (e.g., McNeely et al., 2002), and students who spoke a foreign language at home (e.g., Chiu et al., 2012) reported lower levels of school connectedness than their peers. Therefore, extant research points to the need to explore individual and contextual factors, especially in the school setting (e.g., interactions in classrooms), in order to provide developmentally appropriate support to foster school connectedness for adolescents.

### Classroom Interactions and School Connectedness

Teachers are essential in shaping classroom climate and promoting school connectedness. Considerable research has documented that effective classroom interactions are important and can promote a variety of positive outcomes, such as academic performance (Curby et al., 2009) and school connectedness (Allen et al., 2021; Chapman et al., 2013; McNeely et al., 2002). Treating classroom interactions as a multidimensional construct, a teacher-student classroom interactions model emphasizes three major domains of classroom interactions: classroom organization,

instructional support, and emotional support (Pianta & Hamre, 2009).

Classroom organization refers to the practices teachers use to help students organize their behavior, time, and attention toward the pursuit of academic goals, such as using effective methods to prevent and redirect misbehavior (Hamre et al., 2013; Pianta & Hamre, 2009; Wang et al., 2020b). Students in classrooms with better organization have more time to engage in classroom activities and ultimately learn more (Pianta & Hamre, 2009; Wang et al., 2020b). Multiple studies have found that positive classroom management, such as giving clear instructions for behavior, positively predicts school connectedness (Chapman et al., 2013; Hawkins et al., 2001; McNeely et al., 2002).

Instructional support refers to the extent to which teachers can effectively implement the content of curriculum or learning activities to support students' cognitive and academic development, such as providing high-quality feedback (Hamre et al., 2013; Pianta & Hamre, 2009). Teaching directly with clear content and process was related to students' affect toward learning, motivation, and satisfaction (Titsworth et al., 2015), which may further facilitate positive student-teacher relationships. Researchers have shown that instructional support, such as clarity and effective feedback, can help students to control frustration and increase interest and motivation, which further promotes learning and school connectedness (Hamre et al., 2013; Martin et al., 2022; Stevens et al., 2007). Based on stage-environment fit theory and previous research, the current study investigated the roles of three indicators of instructional support: directed instruction, adaptive instruction, and teacher feedback.

Emotional support refers to teacher efforts to support students' social and emotional functioning in the classroom, such as placing an emphasis on students' own interests and points of view (Hamre et al., 2013). When teachers provide an emotionally supportive environment, students are able to be more self-reliant and willing to take intellectual risks (Hamre et al., 2013). Previous findings have supported that students whose teachers offer more emotional support have more positive and respectful relationships with their teachers, which promotes school connectedness (Allen et al., 2021; Chapman et al., 2013; Chiu et al., 2012). For example, in a study using data from 41 countries, Chiu et al. (2012) showed that students who perceived stronger emotional support from their teachers and had better teacher-student relationships reported a greater sense of belonging at school.

In summary, most studies of classroom interactions have focused on one or two dimensions, whereas we know much less about other dimensions (e.g., instructional support; Brewster & Bowen, 2004; Joyce & Early, 2014; Sakiz, 2012). Several studies have noted that classroom management, instructional support, and emotional support are interdependent and are uniquely and collectively associated with

adolescent developmental outcomes (Hamre et al., 2014; Wang et al., 2020a, b). Given that these dimensions affect each other and are distinct in capturing different aspects of students' learning environments, they should be studied in conjunction with one another rather than focusing on only one dimension (Wang et al., 2020b). Furthermore, some studies have found that different dimensions of classroom interactions are associated with different academic or psychosocial outcomes (Curby et al., 2009; Wang et al., 2020b). For example, one study found that emotional support was more strongly related to anxiety and depression than were classroom management and instructional support (Wang et al., 2020b). Another study also called for more research to examine which particular teacher behaviors most strongly contribute to school connectedness (Niehaus et al., 2012). The three dimensions of classroom interactions may predict different aspects of school connectedness (i.e., teacher support and school belonging) in specific ways. Furthermore, most previous studies have focused on classroom interactions and school connectedness in general instead of at the course level, which may bias results as students' perceptions of elements of school connectedness (e.g., teacher support) can vary significantly across courses in high school. A recent review pointed out that as students in secondary schools move from class to class through the day, a more course-specific approach to perceptions of school and school-based relationships might be important (Graham et al., 2022).

English is a core curriculum area in high school and prepares students with essential skills (e.g., reading, writing) for higher education and future work. However, data from the most recent National Assessment of Educational Progress (NAEP) showed that only 31% of 8th graders and 37% of 12th graders performed at or above the proficient level in reading (National Center for Education Statistics, 2022). In addition, English classes often incorporate engagement with emotionally-laden topics (e.g., violence, grief, racial bias) in the process of discussions about literature (Dunn & Johnson, 2020; Franzak & Noll, 2006). A supportive classroom environment may be particularly important when students are engaging with such challenging topics. Therefore, the present study specifically focused on classroom interactions and one element of school connectedness (i.e., teacher support) in English classes. In addition to classroom interactions, since parental support is a critical proximal process in adolescent development, it is important to investigate the roles of teachers and parents collectively, which can help to distinguish the effects of these important relationships from one another.

### Parental Support and School Connectedness

Parental support refers to the extent to which parents provide academic and social support, such as care and

encouragement (Allen et al., 2021). In the past few decades, considerable research has highlighted the impact of parental support on academic variables, such as school engagement and academic achievement, from elementary to high school (Boonk et al., 2018; Wang & Eccles, 2012; Wang & Sheikh-Khalil, 2014). For example, a review of 75 studies found that parental encouragement and support positively predicted academic achievement (Boonk et al., 2018). More recently, studies have begun to elucidate the relation between parental support and school connectedness (Allen et al., 2018; Wang & Eccles, 2012; Waters et al., 2010). A recent meta-analysis of 18 studies with 29,778 participants showed that parental support had a strong effect on school belonging (Allen et al., 2018). Overall, although parent-child relationships may shift during adolescence (Allen et al., 2018), having parental support can help adolescents to better navigate challenges and promote school connectedness.

## Current Study

Based on the literature reviewed above, several research gaps warrant further attention. First, compared to studies investigating how school connectedness impacts a variety of outcomes, few studies have explored its precursors and investigated how school connectedness could be fostered. Second, most studies to date have measured school connectedness as a unidimensional construct. Third, research has mainly focused on one or two dimensions of classroom interactions in relation to school connectedness rather than investigating three dimensions collectively. Fourth, few studies have examined classroom interactions and school connectedness at the course level. Therefore, the present study aimed to advance previous research by investigating how perceived parental support and three dimensions of classroom interactions at the course level, after controlling for background variables (i.e., gender, race, and language spoken at home), contribute to two key elements of school connectedness (i.e., teacher support at the course level, school belonging in general) among a group of adolescents in the United States, using data from PISA 2018.

Specifically, the following five main research questions were examined, after controlling for adolescents' characteristics. First, what are the relations between parental support and two elements of school connectedness (i.e., teacher support at the course level, school belonging in general). Second, what are the relations between classroom management and two elements of school connectedness. Third, what are the relations between three elements of instructional support (i.e., teacher-directed instruction, adaptive instruction, and teacher feedback) and two elements of school connectedness. Fourth, what are the

relations between teacher emotional support and two elements of school connectedness. Fifth, are the three dimensions of classroom interactions related to the two elements of school connectedness differentially.

## Method

### Participants

The current study used data from PISA 2018, which is a large international comparative study of the knowledge, skills, and competencies of 15-year-old students in the domains of reading, mathematics, and science (OECD, 2020). The PISA U.S. sample consisted of 4838 students (ages 15.33–16.33,  $M = 15.84$ ,  $SD = 0.29$ ) from 164 schools. For the schools, the sample included 95% public schools and 5% private schools; 41.2% from suburban areas, 30.4% from cities, 18.4% from rural areas, and 10.1% from towns; 41.3% from the South, 25.3% from the West, 18.7% from the Midwest, and 12.9% from the Northeast. For gender, the sample included 2376 females (49.1%) and 2462 males (50.9%). For race / ethnicity, the sample included 43.34% White, 25.24% Hispanic or Latino, 15.89% Black or African American, 7.59% two or more races, 5.87% Asian, and 0.97% other races. For language spoken at home, 83.8% of participants reported English, 10.7% Spanish, and 4.5% another language.

### Measures

All measures included in the current study were drawn from the 2018 PISA Student Questionnaire (OECD, 2018a; see Supplement). The measures were developed based on construct frameworks, reviewed by a group of experts, and validated to ensure content and construct validity (OECD, 2018b, c). Specifically, for classroom interactions and teacher support, participants were asked to report on the class relevant to their test language (i.e., English). Thus, all students in this sample are reporting on their English teacher/classroom when asked class or teacher specific questions.

### Parental support

Parental support was measured by three items in the PISA Student Questionnaire (OECD, 2018a; e.g., “My parents support me when I am facing difficulties at school”). Students were asked to indicate how much each item was characteristic of their experience with their parents during this academic year on a four-point scale from 1 = Strongly disagree to 4 = Strongly agree. Higher scores indicated greater levels of parental support. The reliability of the measure (coefficient alpha) in the current sample was 0.90.

## Classroom interactions

Three domains of classroom interactions were assessed: classroom management, instructional support, and emotional support.

**Classroom management** Classroom management was measured by five items in the PISA Student Questionnaire (OECD, 2018a; e.g., “The teacher has to wait a long time for students to quiet down.”). Students were asked to indicate how often each item occurred during their English classes from 1 = Every lesson to 4 = Never or hardly ever. Higher scores indicated more effective classroom management. The reliability of the measure in the current sample was 0.89.

**Instructional support** Instructional support included three elements: teacher-directed instruction, adaptive instruction, and teacher feedback.

*Teacher-directed instruction.* Teacher-directed instruction was measured by four items in the PISA Student Questionnaire (OECD, 2018a; e.g., “The teacher sets clear goals for our learning”). Students were asked to indicate how often each item occurred during their English classes from 1 = Every lesson to 4 = Never or hardly ever. All items were reverse scored, with higher scores indicating greater levels of directed instruction. The reliability of the measure in the current sample was 0.81.

*Adaptive instruction.* Adaptive instruction was measured by three items in the PISA Student Questionnaire (OECD, 2018a; e.g., “The teacher adapts the lesson to my class’s needs and knowledge.”). Students were asked to indicate how often each item occurred during their English classes from 1 = Never or almost never to 4 = Every lesson or almost every lesson. Higher scores indicated greater levels of adaptive instruction. The reliability of the measure in the current sample was 0.80.

*Teacher feedback.* Teacher feedback was measured by three items in the PISA Student Questionnaire (OECD, 2018a; e.g., “The teacher tells me in which areas I can still improve”). Students were asked to indicate how often each item occurred during their English classes from 1 = Never or almost never to 4 = Every lesson or almost every lesson. Higher scores indicated greater levels of teacher feedback. The reliability of the measure in the current sample was 0.90.

**Emotional support** Emotional support from teachers was measured by three items in the PISA Student Questionnaire (OECD, 2018a; e.g., “I felt that my teacher understood me”). Students were asked to indicate how much each item was characteristic of their past two English classes on a four-point scale from 1 = Strongly disagree to 4 = Strongly agree. Higher scores indicated greater levels of emotional

support from teachers in recent classes. The reliability of the measure in the current sample was 0.88.

## School connectedness

School connectedness was assessed with two key elements: teacher support and school belonging.

**Teacher support** Teacher support was measured by four items in the PISA Student Questionnaire (OECD, 2018a; e.g., “The teacher shows an interest in every student’s learning”). Students were asked to indicate how often each item occurred during their English classes from 1 = Every lesson to 4 = Never or hardly ever. All items were reverse scored, with higher scores indicating greater levels of teacher support. The reliability of the measure in the current sample was 0.90.

**School belonging** School belonging was measured by six items in the PISA Student Questionnaire (OECD, 2018a; e.g., “I feel like an outsider (or left out of things) at school.”). Students were asked to indicate how much each item was characteristic of their experience when thinking about their schools on a four-point scale from 1 = Strongly agree to 4 = Strongly disagree. Three items were positively phrased and the other three were negatively phrased. To facilitate interpretation and ensure all the items were coded in the same direction, the three items that were positively phrased were reverse scored. Higher scores indicated greater levels of school belonging. The reliability of the measure in the current sample was 0.84.

## Student covariates

The following three background variables were utilized as control variables: gender, race, and language spoken at home. For interpretation purposes, gender (female = 0; male = 1), race (White = 0; all other races = 1), and language spoken at home (English = 0; language other than English = 1) were dummy coded.

## Data Analysis

All analyses were conducted in Mplus 8.8 (Muthén & Muthén, 1998–2017). As the PISA data was in a multilevel setting with students nested in schools, the assumption of independence of observations was violated. Therefore, before examining the research questions using structural equation modeling (SEM), an unconditional multilevel confirmatory factor analysis (MCFA) was conducted first to calculate intraclass correlation coefficient (ICC) for the dependent variables, which estimated the proportion of variance in outcomes explained by school-level variation. If the data clustering is substantial, it is essential to take the

interdependence of observations into account to ensure unbiased estimates in standard errors of parameters.

The ICCs, which were calculated using the between-level variation divided by the sum of between-level and within-level variations, were 0.03 for teacher support and 0.007 for school belonging, indicating that only 3% of the total variability in teacher support and 0.7% of the total variability in school belonging could be explained by school-level variation. One possible reason for the lack of between-school variation is that on average, only 30 students were sampled in each school. The relatively small sample size in each school may result in low interdependency among the students within the same school and high variability within schools. As ICC for school belonging was relatively small, only teacher support’s cluster effect was accounted for in the present study. Therefore, two-level structural equation modeling was conducted to test the research questions. To retain all the information, full information maximum likelihood (FIML) was used to handle missing data (less than 4.4%; Table 1). FIML is more efficient and still produces unbiased estimators with missing data (Enders & Bandalos, 2001). Maximum likelihood with robust standard errors (i.e., MLR) was conducted to account for non-normality. Model fit was evaluated by the chi-square test, comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). Values of CFI greater than 0.95, RMSEA below 0.06, and SRMR below 0.08 indicate a reasonably good fit (Hu & Bentler, 1999).

## Results

### Descriptive Statistics

Means, standard deviations, and correlations among all variables are presented in Table 1. As expected, the three

domains of classroom interactions had moderate-to-strong positive correlations with each other ( $r_s = 0.17–0.56$ ). Classroom interactions and parental support were positively correlated with two elements of school connectedness (i.e., teacher support and school belonging;  $r_s = 0.15–0.67$ ).

### Structural Equation Model

For the measurement model, the confirmatory factor analysis (CFA) results showed that the model had a good fit to the data,  $\chi^2(411) = 3320.14, p < 0.001, CFI = 0.96, RMSEA = 0.038, SRMR$  (within-school level) = 0.029. For the structural model, the results indicated a good fit:  $\chi^2(483) = 4062.49, p < 0.001, CFI = 0.95, RMSEA = 0.039, SRMR$  (within-school level) = 0.031. The  $R^2$  for teacher support and school belonging were 0.66 and 0.15 respectively, meaning that 66% and 15% of the variances were explained by the model.

For the three student covariates, gender was positively related to school belonging ( $b = 0.14, \beta = 0.10, p < 0.001$ ), but not teacher support ( $b = -0.022, \beta = -0.014, p = 0.15$ ); males had higher school belonging than females in the current sample. Race was negatively related to teacher support ( $b = -0.050, \beta = -0.036, p = 0.005$ ), but positively related to school belonging ( $b = 0.057, \beta = 0.042, p = 0.016$ ); compared to White students, students of other races reported lower teacher support but higher school belonging in the current sample. Language spoken at home was negatively associated with school belonging ( $b = -0.071, \beta = -0.038, p = 0.014$ ), but not teacher support ( $b = 0.010, \beta = 0.005, p = 0.68$ ); students who spoke languages other than English at home reported lower school belonging than students who spoke English at home.

The model (see Fig. 1) showed that after controlling for students’ gender, race, and language spoken at home, parental support positively predicted school belonging

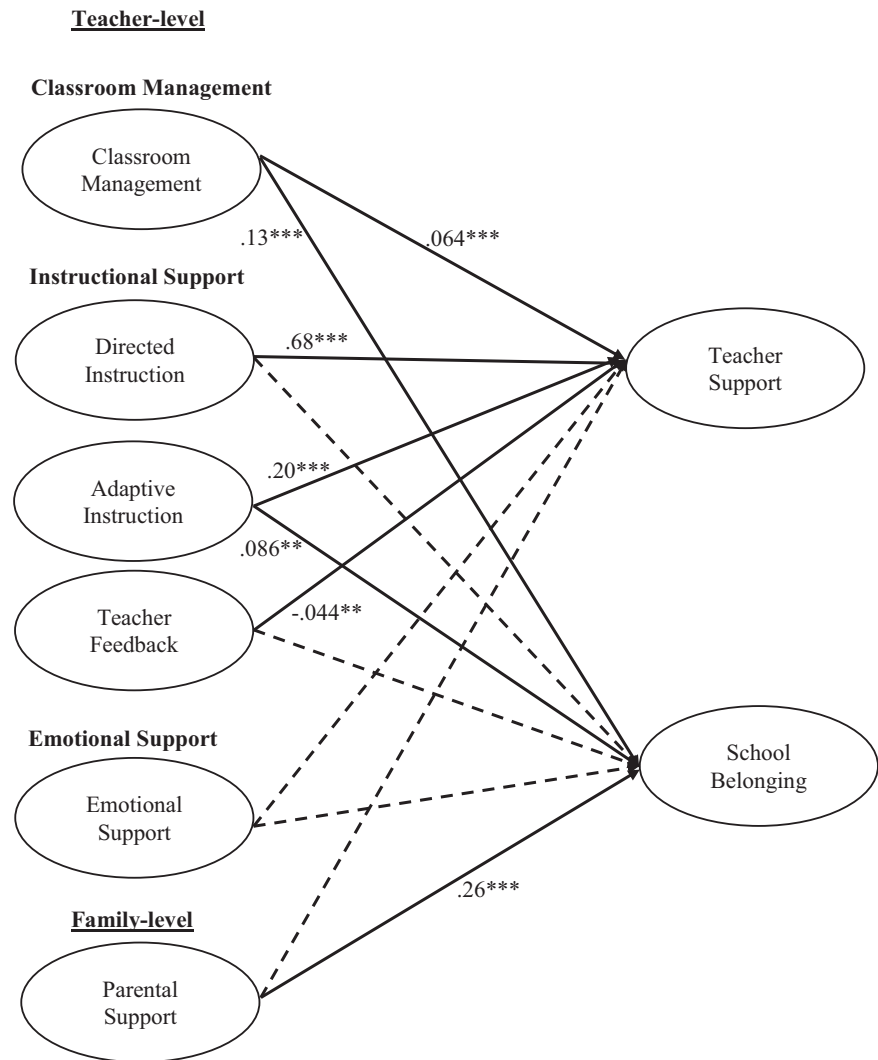
**Table 1** Descriptive statistics

Variable	1	2	3	4	5	6	7	8
1. Classroom Management	–							
2. Directed Instruction	0.17***	–						
3. Adaptive Instruction	0.22***	0.42***	–					
4. Teacher Feedback	0.19***	0.40***	0.56**	–				
5. Emotional Support	0.23***	0.27***	0.51***	0.41***	–			
6. Parental Support	0.12***	0.15***	0.16***	0.16***	0.19***	–		
7. Teacher Support	0.24***	0.67**	0.49***	0.39***	0.34***	0.17***	–	
8. School Belonging	0.17***	0.15***	0.18***	0.16***	0.17***	0.26***	0.16***	–
<i>M</i>	3.00	2.99	2.58	2.56	2.86	3.36	3.14	2.89
<i>SD</i>	0.71	0.73	0.78	0.88	0.75	0.72	0.77	0.60
Missing (%)	1.2	2.3	2.5	2.5	2.2	4.3	1.4	4.3

*M* mean, *SD* standard deviation

\*\* $p < 0.01$ ; \*\*\* $p < 0.001$

**Fig. 1** Parameter estimates from structural equation model predicting school connectedness. Standardized coefficients were reported, after controlling for students' gender, race, and language spoken at home. Solid lines indicate significant paths. Dashed lines indicate non-significant paths. Covariates among variables were omitted in the figure for simplicity. All the covariates among the independent variables were statistically significant ( $p < 0.001$ ): CM with DI,  $r = 0.21$ , CM with AI,  $r = 0.27$ , CM with TF,  $r = 0.21$ , CM with ES,  $r = 0.26$ , CM with PS,  $r = 0.14$ ; DI with AI,  $r = 0.53$ , DI with TF,  $r = 0.46$ , DI with ES,  $r = 0.33$ , DI with PS,  $r = 0.18$ ; AI with TF,  $r = 0.64$ , AI with ES,  $r = 0.61$ , AI with PS,  $r = 0.19$ ; TF with ES,  $r = 0.45$ , TF with PS,  $r = 0.17$ ; ES with PS,  $r = 0.21$ . CM classroom management, DI directed instruction, AI adaptive instruction, TF teacher feedback, ES emotional support, PS parental support. \*\* $p < 0.01$ . \*\*\* $p < 0.001$



( $b = 0.29$ ,  $\beta = 0.26$ ,  $p < 0.001$ ), but not teacher support in English classes ( $b = 0.020$ ,  $\beta = 0.018$ ,  $p = 0.12$ ).

Classroom management in English classes positively predicted teacher support in that course ( $b = 0.065$ ,  $\beta = 0.064$ ,  $p < 0.001$ ) and school belonging in general ( $b = 0.13$ ,  $\beta = 0.13$ ,  $p < 0.001$ ), which indicated that more effective classroom management predicted higher levels of teacher support and school belonging.

For instructional support, teacher-directed instruction in English classes positively predicted teacher support in that course ( $b = 0.70$ ,  $\beta = 0.68$ ,  $p < 0.001$ ), but not school belonging in general ( $b = 0.036$ ,  $\beta = 0.036$ ,  $p = 0.15$ ). Greater levels of directed instruction, in which teachers set and assess progress toward goals for student learning, predicted higher levels of teacher support but did not predict school belonging. Adaptive instruction in English classes positively predicted teacher support in that course ( $b = 0.19$ ,  $\beta = 0.20$ ,  $p < 0.001$ ) and school belonging in general ( $b = 0.079$ ,  $\beta = 0.086$ ,  $p = 0.005$ ), which indicated greater levels of adaptive instruction (i.e., greater flexibility

and individuation of instruction) predicted higher levels of teacher support and school belonging. However, teacher feedback in English classes negatively predicted students' perceptions of teacher support in that course ( $b = -0.038$ ,  $\beta = -0.044$ ,  $p = 0.008$ ) and did not predict school belonging ( $b = 0.001$ ,  $\beta = 0.001$ ,  $p = 0.97$ ). In other words, students who reported more teacher feedback perceived less teacher support, but feedback was unrelated to perceptions of school belonging.

Similarly, emotional support in English classes was unrelated to teacher support in that course ( $b = 0.024$ ,  $\beta = 0.023$ ,  $p = 0.17$ ) and school belonging ( $b = 0.042$ ,  $\beta = 0.042$ ,  $p = 0.11$ ).

## Discussion

Given that one of research gaps in the existing literature on school connectedness is the lack of attention to its predictors, the current study explored the relations of three domains of

classroom interactions with school connectedness, after taking the effects of student characteristics and parental support into account, using a sample of adolescents in the United States. Building upon existing literature, the study attempted to advance the current knowledge from several perspectives. First, this study focused on a developmentally sensitive period (i.e., middle adolescence) when school connectedness is particularly critical for students to navigate developmental and academic challenges, but often reported to decrease meaningfully. Additionally, rather than examining outcomes of school connectedness, the present study explored its predictors, which have been less commonly examined. Such contributions may allow practitioners to design interventions to foster school connectedness for adolescents in the future. Second, instead of treating school connectedness as a unidimensional construct, the current study measured school connectedness as a multidimensional phenomenon including two key elements: perceived teacher support as an autonomy component and school belonging as a relational component, and investigated whether classroom interactions and parental support may impact these two elements of school connectedness in specific ways. Third, this study collectively highlighted three domains of classroom interactions in promoting school connectedness rather than discussing only one dimension. Fourth, school connectedness both at the course level and in general were investigated in the current study.

Four key findings emerged from this study. First, parental support positively predicted school belonging, but not teacher support. Second, after accounting for parental support, classroom management in English classes positively predicted perceptions of teacher support in that course and school belonging in general. Third, among the three elements (i.e., directed instruction, adaptive instruction, and teacher feedback) of instructional support, only adaptive instruction predicted both teacher support and school belonging, and the other two predicted teacher support only. Fourth, emotional support in English classes did not predict teacher support in that course or school belonging in general. Additionally, it is important to note that the model explained a larger amount of the variance in teacher support than in school belonging, which could be attributed to the fact that most predictors in the current study were at the course level. Below, the main findings are discussed in detail.

### Classroom Interactions and School Connectedness

The current study highlights the important role of teachers in fostering school connectedness for adolescents, after taking the effects of student demographic characteristics and parental support into account. Consistent with previous studies (e.g., Allen et al., 2021; McNeely et al., 2002), the findings provide evidence that teachers who offer more

effective classroom interactions can better facilitate the development of adolescents' school connection. In addition, the three domains of classroom interactions were interdependent but affected different elements of school connectedness in specific ways, which is in line with previous findings that different dimensions of classroom interactions are uniquely associated with adolescent development (e.g., Wang et al., 2020b).

More specifically, the results showed that teachers who used more effective classroom management not only facilitated teacher support in their specific classes but also school belonging in general, which confirms the results from previous research (Chapman et al., 2013; Hawkins et al., 2001; McNeely et al., 2002). In other words, adolescents who perceived that their English teachers managed class well (e.g., keeping classroom disruptions from interrupting instruction) believed their teachers in that course cared more about their learning and expressed greater sense of belonging to their schools. One possible explanation is that teachers who have consistent rules to address students' disruptive behaviors and are able to prevent or redirect misbehaviors can thus focus more time and attention on teaching, such as fulfilling individuals' learning needs. This could make students feel their teachers care about their learning and promote a sense of belonging to school in general.

Regarding instructional support, a small but important body of research suggests that classroom instruction is valuable for promoting school connectedness (e.g., Hawkins et al., 2001; Stevens et al., 2007). Consistent with prior findings, the present study found that directed instruction in English classes promoted perceptions of teacher support in that course, but not overall school belonging; adaptive instruction in English classes predicted both perceptions of teacher support in that course and school belonging; interestingly, teacher feedback in English classes negatively predicted teacher support in that course, but was unrelated to school belonging. That is to say, adolescents with teachers who provided greater levels of instructional support (e.g., establishing clear learning goals and adapting lessons to fulfill individuals' learning needs), perceived their teachers as more responsive and supportive. Moreover, compared with adaptive instruction, directed instruction had a stronger effect on perceptions of teacher support. It is possible that directed instruction helps students to learn in a more goal-oriented way which facilitates learning and is beneficial to a broader group of students, whereas adaptive instruction may be especially helpful for students who experience more learning difficulties. In addition, although adaptive instruction also positively predicted school belonging, suggesting that teachers may enhance school belonging by providing adaptive lessons and extra help when students encounter learning difficulties, it is important to note that the effect size was relatively small after



accounting for other factors (e.g., classroom management). Surprisingly, adolescents who reported their teachers provided more feedback reported lower perceptions of teacher support. As several studies have emphasized the importance of quality rather than quantity of feedback (Miller & Wang, 2019; Pianta et al., 2012), it might be that some teachers are providing feedback that is insufficient or not constructive enough for adolescents to improve their learning and such feedback may undermine positive feelings about the teacher or course. In addition, certain types of feedback (e.g., criticism) may undermine a sense that the teacher is supportive or trustworthy, particularly in the absence of other positive messages or relationship qualities (Yeager et al., 2014). Overall, it is important to note that although having higher levels of instructional support for a specific course may facilitate perceptions of teacher support in that course, it may be not sufficient to foster school belonging in general.

Correlational results showed that emotional support was positively correlated with both teacher support and school belonging. However, contrary to expectations, the model showed that emotional support from their English teachers was not associated with adolescents' perceptions of teacher support in that course or school belonging in general, after accounting for classroom management, instructional support, and parental support. This finding is inconsistent with previous studies that found students who perceived greater emotional support from their teachers reported higher levels of school belonging (e.g., Chiu et al., 2012). One possible reason is that rather than investigating multiple domains of classroom interactions, previous research (e.g., Brewster & Bowen, 2004; Chiu et al., 2012) mainly focused on emotional support. That is, previous findings regarding the impact of teacher emotional support may be better explained by other, related aspects of classroom interactions.

Overall, teachers play a critical role in fostering school connectedness through classroom interactions. Specifically, this study found that classroom management was more important in fostering school belonging as a relational component, whereas instructional support at the course level, especially directed and adaptive instruction, played a key role in promoting perceptions of teacher support in that course as an autonomy component. However, as limited existing research has focused on multiple domains of classroom interactions collectively in relation to school connectedness, further research is needed to confirm these findings.

### Parental Support and School Connectedness

The present study supports that parents play a critical role in fostering adolescents' relational component of school connectedness. The finding showed that adolescents with greater levels of parental support reported higher levels of school belonging, which is consistent with previous studies

(Allen et al., 2018; Monahan et al., 2010; Wang & Eccles, 2012). Adolescents who perceive that their parents are supportive and emphasize the importance of education are more likely to value education and the role of school (Pomerantz et al., 2007; Wang & Eccles, 2012; Wang & Sheikh-Khalil, 2014), which may further promote school belonging. In addition, based on attachment theory (Bowlby, 1983) and previous studies (e.g., Pomerantz et al., 2007), adolescents with more supportive parents are more likely to form positive relationships in school, which results in greater school belonging. Although some prior research indicated that the effect of parental support decreased over time from childhood to adolescence (e.g., Hostinar et al., 2015), the present study offers empirical evidence that parental support is still critical for adolescents and has an independent effect on the relational component of school connectedness.

### Limitations and Future Directions

Before concluding, it is important to acknowledge several limitations of the present study. First, although this study investigated multiple elements in three major domains of classroom interactions, further research is needed to consider other aspects of classroom interactions, specifically in more detailed exploration of classroom management and emotional support. Second, it is a strength that the present study not only measured school connectedness in general but also included classroom interactions and school connectedness at the course level, but focusing on one course may only capture a single aspect of students' learning and social development. In addition, it is important to note that data regarding students' English classroom placements was not available, and therefore analyses for cluster effects by classroom could not be conducted in the present study. As limited existing studies have focused on classroom interactions or school connectedness at the course level, additional research is needed to replicate these findings, especially for adolescents as they move to different classes through the day. Third, the current study solely relied on self-reported information from adolescents, which may introduce social desirability bias. However, one study (Wang et al., 2020a) used a multi-informant approach to investigate classroom interactions and found that student-reported classroom interactions were moderately correlated with observer-reported ones and predicted math engagement and performance, but teacher-reported interactions did not align with student or observer perspectives and did not predict math outcomes. In other words, although self-reported measures may be somewhat biased, student perceptions may be more related to objective ratings (e.g., observer report) than teacher perspectives are. In addition, the variables examined in the current study (e.g., sense of

belonging) are by definition tied to adolescents' own beliefs or perceptions, rather than what happened objectively. Therefore, self-report may be a more appropriate approach compared with other methods. Finally, as all the data in the current study were collected at the same time point, causation cannot be established. However, because the model guiding this research is theoretically and empirically grounded, these variables may be related to one another in these specific directions. Further research is needed to confirm these associations in the future.

## Conclusion

Despite the well-documented associations between school connectedness and a variety of outcomes for adolescents, there is a lack of research exploring how school connectedness could be fostered. The present study addressed the research gap by exploring the roles of parental support and classroom interactions in predicting two elements of school connectedness (i.e., school belonging and teacher support) among a sample of adolescents in the United States. The findings showed that school belonging was positively predicted by parental support, classroom management, and adaptive instruction. Teacher support was positively predicted by classroom management, directed instruction, and adaptive instruction, but was negatively predicted by teacher feedback. In summary, the results underscore the unique roles of three domains of classroom interactions (i.e., classroom management, instructional support, and emotional support) and parental support in predicting different elements of school connectedness for adolescents. Given the numerous changes and challenges adolescents face during this critical period, providing more parental support and more effective classroom interactions, especially in classroom management, directed instruction, and adaptive instruction, can facilitate the development of school connectedness as a protective factor, which may have a great benefit in helping adolescents to better navigate academic challenges and engage in critical developmental tasks.

**Authors' Contributions** A.P. conceived of the study, participated in its design and coordination, performed the statistical analysis, and drafted the manuscript. M.M.P. participated in the design of the study and drafted the manuscript. S.J. participated in the statistical analysis and interpretation of the data. All authors read and approved the final manuscript.

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**Data Sharing and Declaration** The datasets analyzed in the current study are available on the OECD website <https://www.oecd.org/pisa/data/2018database/>.

## Compliance with Ethical Standards

**Conflict of Interest** The authors declare no competing interests.

**Informed Consent** Information regarding informed consent is reported in the PISA 2018 technical report on the OECD website <https://www.oecd.org/pisa/data/pisa2018technicalreport/>.

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