How teacher emotional support motivates students:

The mediating roles of perceived peer relatedness, autonomy support, and competence

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ABSTRACT

Multilevel mediation analyses test whether students' mid-year reports of classroom experiences of autonomy, relatedness with peers, and competence mediate associations between early in the school year emotionally-supportive teacher-student interactions (independently observed) and student-reported academic year changes in mastery motivation and behavioral engagement. When teachers were observed to be more emotionally-supportive in the beginning of the school year, adolescents reported academic year increases in their behavioral engagement and mastery motivation. Mid-year student reports indicated that in emotionally-supportive classrooms, adolescents experienced more developmentally-appropriate opportunities to exercise autonomy in their day-to-day activities and had more positive relationships with their peers. Analyses of the indirect effects of teacher emotional support on students' engagement and motivation indicated significant mediating effects of autonomy and peer relatedness experiences, but not competence beliefs, in this sample of 960 students (ages 11–17) in the classrooms of 68 middle and high school teachers in 12 U.S. schools.

1. Introduction

Teacher emotional support is essential to high quality instruction (National Research Council, 2004: Pianta & Hamre, 2009; Wubbels & Brekelmans, 2005), and evidence links teacher-provided emotional support to students' motivation and engagement (Cooper, 2013; Eccles & Wang, 2014; Patrick, Ryan, & Kaplan, 2007; Reyes, Brackett, Rivers, White, & Salovey, 2012; Roorda, Koomen, Spilt, & Oort, 2011; Ryan & Patrick, 2001; Skinner, Furrer, Marchand, & Kindermann, 2008). In this study we investigate whether the link between teacher emotional support and student motivation can be explained by students' self-reported experiences in their classroom. We draw on self-determination theory (Deci, Vallerand, Pelletier, & Ryan, 1991; Ryan & Deci, 2000), which in prior research finds that satisfaction of three needs—autonomy, relatedness, and competence—are keys to understanding students' motivation and engagement. Based on this work, we examine whether students' perceived *classroom experiences* that are targeted at meeting their needs for autonomy, relatedness, and competence beliefs mediate associations between teachers' emotional support, as independently observed, and students' self-reported changes in motivation (mastery achievement goals) and behavioral engagement.

1.1. Emotionally-supportive interactions in the classroom

Teacher emotional support comprises teachers' demonstration of genuine concern for and care about their students, respect for their students, desire to understand students' feelings and points of views, and dependability (Patrick, Anderman, & Ryan, 2004; Pianta & Allen, 2008; Pianta & Hamre, 2009). Multiple motivational

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theories, including self-systems theory (Connell & Wellborn, 1991; Skinner et al., 2008), achievement goal theory (Ames, 1992; Dweck & Leggett, 1988), and self-determination theory (Deci et al., 1991; Ryan & Deci, 2000), identify these attributes as pivotal to positively motivating and engaging students, and the evidence is fairly robust in supporting this supposition (see Wigfield, Eccles, Schiefele, Roeser, & Davis-Keane, 2006 for a review). Although motivationally-oriented research on teacher emotional support is largely based on student reports of teacher behaviors, a strength of this study is that teachers' emotionally-supportive behaviors are measured directly using the Classroom Assessment Scoring System-Secondary (CLASS-S; Pianta, Hamre, Hayes, Mintz, & LaParo, 2011), which focuses on teacher-student interactions that promote students' cognitive and social development in educational settings (Hamre & Pianta, 2010). Based largely on adolescent developmental and motivation research, CLASS-S′ emotional support domain is defined as teacher-student interactions that promote social connection and cohesion, convey concern for students' feelings and interest in their individuality, and honor students' desire to learn meaningful material and have a say in their learning.

CLASS-S captures the broad construct of emotionally-supportive teacher-student interactions as they are evidenced in three dimensions. *Positive climate* includes the presence of shared positive affect (e.g., laughter and enthusiasm), an interactive peer environment, communication of positive expectations, and the use of respectful language and cooperation. *Teacher sensitivity* is indicated by a teacher's awareness of and responsiveness to students' cues (e.g., misunderstanding, distress, and emotionality), timely provision of help when students ask for it, and the degree of student responsiveness and openness to a teacher's questions. A teacher's *regard for adolescent students' perspectives* is demonstrated through encouragement and following of students' ideas and opinions, making connections to students' experiences, providing meaningful choices and opportunities to take leadership roles, and incorporating meaningful peer interactions into classroom activities. Taken together, positive climate, teacher sensitivity, and regard for adolescent students' perspectives provide a measure of emotional support that is inclusive of the variety of ways emotional support has been conceptualized in the literature.

A comprehensive measure of emotionally-supportive teacher-student interactions is key to this investigation because we are interested in identifying mechanisms to explain consistent findings relating teachers' provision of emotional support to students' self-reported motivation and engagement (Assor, Kaplan, & Roth, 2002; Cooper, 2013; Eccles & Wang, 2014; Patrick et al., 2007; Reyes et al., 2012; Roorda et al., 2011; Ryan & Patrick, 2001; Skinner et al., 2008). The mechanisms we consider are students' experiences in their classroom, specifically experiences targeted to meeting the three needs suggested by self-determination theory (Deci et al., 1991; Ryan & Deci, 2000), which have previously been posited as potential mechanisms to explain the positive effects of emotionally-supportive classroom interactions (Fredricks, Blumenfeld, & Paris, 2004; Skinner et al., 2008).

1.2. Self-determination theory

The satisfaction of an individual's needs for autonomy, relatedness, and competence is critical to the development of self-determination (Deci et al., 1991; Ryan & Deci, 2000), which is the autonomous (and internal) regulation of behavior. When autonomy needs are thwarted, an individual's behavior is neither governed nor initiated by the self. A desire for control over one's activities becomes increasingly salient during adolescence (Eccles et al., 1993; Kegan, 1994; Pianta & Allen, 2008). Social actors and contexts play a critical role in the satisfaction of these needs. Meeting autonomy needs can lead to the adoption of positive motivational states, including mastery achievement goals (Ames, 1992) and intrinsic motivation (Ryan & Deci, 2000), and autonomy itself is a key facilitator of engagement in self-systems theory (Connell & Wellborn, 1991).

Being in an autonomy-supportive environment is associated with psychological well-being, learning, achievement, and positive development (see Reeve, 2009 for a review). Autonomy support is associated with students' observed and self-reported *engagement* (Assor et al., 2002; Benita, Roth, & Deci, 2014; Hafen et al., 2012; Jang, Reeve, & Deci, 2010; Reeve, Jang, Hardre, & Omura, 2002; Skinner & Belmont, 1993; Skinner et al., 2008) and their motivation to develop and improve their competence (i.e., *mastery motivation*; Ciani, Middleton, Summers, & Sheldon, 2010; Greene, Miller, Crowson, Duke, & Akey, 2004; Ryan & Grolnick, 1986).

The need for relatedness (Ryan & Deci, 2000) is foundational to optimal human development (Baumeister & Leary, 1995; Hartup, 1982) given that interpersonal relationships can buffer against stress and are instigators of positive motivational states (Martin & Dowson, 2009). *Peer* relationships take on a heightened significance in adolescence (Hartup, 1982; Martin & Dowson, 2009; Wentzel, 2005). Adolescents' feelings of relatedness with classroom peers, including the sense that one belongs to the classroom community (Goodenow, 1993), are associated with perceptions of the classroom motivational climate (Anderman, 2003), achievement motivation (Anderman & Anderman, 1999; Nelson & DeBacker, 2008), school interest (Wentzel, Battle, Russell, & Looney, 2010), prosocial goal pursuit (Wentzel, 1998; Wentzel, Baker, & Russell, 2012), self-efficacy beliefs (Nelson & DeBacker, 2008; Ryan & Patrick, 2001), expectancies for success (Goodenow, 1993), and behavioral and emotional engagement (Furrer & Skinner, 2003). Students who feel less connected to their peers report low emotional engagement in school (Furrer & Skinner, 2003). Promoting positive peer interactions may be beneficial to adolescents' engagement and motivation because peers support students' pursuit of their academic and social goals (Patrick et al., 2004; Wentzel, 2005).

The need for competence is satisfied when one experiences their behavior as effectively enacted (Niemiec & Ryan, 2009). Competence shares similarities with self-efficacy (Bandura, 1997), which is one's *belief* that they can enact desired behaviors successfully. In this study we measure students' beliefs about their academic competence, which is enhanced when students feel a sense of peer belongingness and respect (Nelson & DeBacker, 2008; Ryan & Patrick, 2001; Sakiz, Pape, & Hoy, 2012), when teachers support their autonomy (Greene et al., 2004) and encourage mastery learning goals over performance goals (Fast et al., 2010; Greene et al., 2004), and when teachers provide emotional or affective support (Fast et al., 2010; Murdock & Miller, 2003; Patrick et al., 2007; Sakiz et al., 2012).

1.3. Mediators of teacher emotional support on student motivation

Motivation research consistently connects teacher emotional support with students' motivation and engagement (Assor et al., 2002; Cooper, 2013; Eccles & Wang, 2014; Patrick et al., 2007; Reyes et al., 2012; Roorda et al., 2011; Ryan & Patrick, 2001; Skinner et al., 2008). This research has not explicitly sought to explain this association, but in the case of engagement, some posit that emotionally-supportive teachers provide students with more opportunities for autonomy, greater interpersonal connectedness, and feelings of competence (Fredricks et al., 2004; Skinner et al., 2008). Indeed, other research finds that emotionally-supportive instruction is associated with students' reports of their opportunities for autonomy, feelings of relatedness, and their self-efficacy

(Assor et al., 2002; Fast et al., 2010; Patrick et al., 2004, 2007; Pianta & Allen, 2008; Reeve, 2006; Reeve & Jang, 2006; Sakiz et al., 2012; Stefanou, Perencevich, DiCintio, & Turner, 2004; Wentzel et al., 2010).

In this study, we bring these strands of motivation research together to explicitly test whether emotionally-supportive teachers motivate and engage their students because students in such classrooms have autonomy-supportive experiences, experience stronger beliefs in their own academic abilities (competence), and have experiences that promote positive and supportive peer relationships. Real-world educational implications of motivation research are addressed through rigorous (cross-informant, longitudinal) multilevel mediational analysis of teacher-student interactions (rated by observers using a highly-validated measure) as they link from students' reports of autonomy, relatedness, and competence experiences to engagement and achievement motivation growth over the course of a school year.

The motivation and engagement outcomes we examine are linked with adaptive learning behaviors and academic achievement. Our motivation outcome originates in achievement goal theory (Dweck & Leggett, 1988; Nicholls, 1984), specifically a *mastery* achievement goal, in which a student's aim is developing competence and understanding of learning tasks. Mastery motivation is linked to increased effort, higher self-efficacy, and greater persistence in learning activities (see Kaplan & Maehr, 2007 for a review). *Engagement* refers to behavioral engagement, which is participatory involvement in academic contexts (e.g., responding to teacher questions, paying attention, and doing assigned work; Fredricks et al., 2004), and strongly predicts academic achievement (Fredricks et al., 2004; Lee, 2014; Reyes et al., 2012).

2. Methods

2.1. Participants

Participants were drawn from the classrooms of 68 different teachers (63% middle school) in 12 public schools (8 middle schools) in a mid-Atlantic US state. Teacher experience was 8 years on average (range 0–34). Teachers were predominantly female (approximately 64%) and white (approximately 84%, 8% African American, 6% mixed ethnicity, and 3% other). Each teacher selected one of their classes for participation in the study. Classes were split across Math (32.7%), English (32.4%), History (20.6%), and Science (14.3%).

In total 960 students consented to participate in the study (62% in middle school). Students were racially and ethnically diverse (63.2% white, 29.4% African American, and 7.4% Hispanic, Asian American, or mixed race). The sample was economically diverse with 34.8% of students qualifying for free or reduced lunch (family income <= 200% of the federal poverty line). On average, 14 students consented per classroom ($SD = 4.46$), and 80 students per school in the 12 study schools ($SD = 68.23$).

2.2. Procedures

Data come from the first year of a randomized field trial of a coaching intervention for teachers. At study outset, a university team presented the research to teachers in each school district. Teachers voluntarily consented to participate in a study of one-to-one professional coaching targeted to increase the quality of teachers' emotional, instructional, and organizational interactions with their students. Teachers were randomly assigned to treatment (coaching intervention) or control (business-as-usual professional development). The coaching intervention included electronic communications and structured meetings (average of eight times during the school year) between teachers and university-based coaches to help teachers improve their interactions with students in ways aligned with the CLASS-S. While we control for a teacher's treatment status, it was unrelated to teachers' emotionally-supportive interaction in the fall and end of year student outcomes examined in this study.[1]

Teachers received a modest monetary compensation for completing surveys and district-issued professional development credit for their participation. Parents of students in target classrooms provided informed consent and students provided assent if they were willing to voluntarily participate in the study. Approximately 78% of students consented to participate. As part of the design, study teachers submitted 40-min video recordings of target classrooms for CLASS-S coding at two-to-three week intervals and administered student surveys early in the year (*fall*), at mid-year (*winter*), and at the end of the year (*spring*).

2.3. Fall observations of emotional support

Each time a teacher submitted a video recording, the video was split into two segments, each 20 min long. Pairs of raters coded 20-min segments on the 11 dimensions CLASS-S (Pianta et al., 2011). The rating scale ranged from 1 (very low quality interactions) to 7 (very high quality interactions). Scores were averaged across raters and the two segments for each time point. Coders were a team of 10 advanced undergraduate and graduate students who were trained to rate the CLASS-S dimensions during a two-day training. At training's end, coders had to pass a reliability test (required score within one point across five master coded video clips on 80% of their codes). Coders regularly met to jointly code master recordings in order to maximize reliability. The inter-rater reliabilities of the double-scored segments (ICC = .64–.78) were consistently in the adequate to good range (Cicchetti & Sparrow, 1981). Approximately 81% of all rater codes were within one point of each other.

Specific behaviors that coders look for vary across dimensions, and some examples of behaviors coders are trained to identify in each dimension of the Emotional Support (ES) domain that was the focus of this study are shown in Table 1. A dimension score is assigned based on whether the teacher and *very few* (low 1–2), *some* (mid 3–5), or *most* (6–7) of the students are having specified interactions (Table 1). Specific guidelines further assist coders in the assignment of a value within these ranges. The point value of a mid-range score depends on whether one or two behavioral indicators fall in the low range (score of 3), all fall in the mid-range (score of 4), or one or two indicators fall in the high range (score of 5). An ES score for each video was calculated from the average of the three dimension scores, and the *fall ES variable used in analyses* was the average of a teacher's ES values on the first three recordings (September–December).

2.4. Student reports of classroom experiences

Autonomy. Students reported on the degree to which they exercised autonomy in their classroom via a 5-item scale developed for this project that showed good reliability in fall and winter ($\alpha = .75$ and .80, respectively). The five items included “Students often get to make decisions about how the class is run”, “Students often get choices about how to do projects or assignments”, “We have a lot of lively discussions”, “Students often feel like they get to help lead the class”, and “The teacher changes what's planned to

[1] Effects of the coaching intervention on teachers' interactions with their students did not appear until the spring of the year *after* teachers received coaching (Authors, 2012).

Table 1
Example behavioral indicators in the emotional support CLASS-S dimensions.

Positive climate
Shared positive affect
Enthusiasm
Positive comments
Listening to each other
Teacher Sensitivity
Notices student difficulties
Acknowledgment of student emotions
Student questions and problems are resolved
Students seek the teacher's help, support, and guidance
Regard for Adolescent Perspectives
Encourages student ideas and opinions
Connects content to students' life
Relaxed structure for movement about the classroom
Peer sharing and group work

make it more interesting for students." Responses were on a 5-point Likert scale from *not at all true* to *very true*. Previous research demonstrated this measure's predictive validity with both observed student engagement and students' self-reported engagement (Hafen et al., 2012).

Relatedness. Students answered four questions in the fall and winter (α = .67 and.71, respectively) from a scale validated and developed by Mikami, Boucher, and Humphreys (2005) assessing whether their classroom *peers* interacted with them in a supportive, positive, and respectful manner. Items included "How many students in this class respect you and listen to what you have to say", "How many students in this class do you not get along with", "How many students in this class tease you, put you down, or pick on you", and "How many students in this class do you get along with". Student responses were arranged on a 5-point Likert scale, and while the exact wording of the responses varied according to the item, the responses ranged from *everybody* to *nobody*.

Competence beliefs. We assessed students' general beliefs about their academic competence via a 3-item scale drawn from the Patterns of Adaptive Learning Survey's (PALS) academic efficacy measure (Midgley et al., 2000), with responses on a 5-point Likert scale (1 = *not at all true* and 5 = *very true*). Reliability for this measure was acceptable in both fall and winter (α = .65 and .76, respectively). The three items include "I can do almost all the work in a class if I don't give up", "I'm certain I can master the skills taught in class this year", and "Even if the work is hard, I can learn it."

2.4.1. Measurement model

Because the measures in section 3.4 have not been used together in prior research, we tested a three factor measurement model with latent variables representing classroom experiences of autonomy, relatedness, and competence beliefs explaining items from the appropriate scale. Separate fall and winter measurement models that were corrected for clustering of students within teachers showed excellent fit to the data (Fall: $\chi^2_{(51)}$ = 101.03, p < .001, CFI = .96, RMSEA = .03, SRMR = .04; Winter: $\chi^2_{(51)}$ = 110.21, p < .001, CFI = .96, RMSEA = .04, SRMR = .05). We further tested for longitudinal measurement invariance in the three constructs by specifying equal factor loadings (metric) and intercepts (scalar) for the indicators across the two time points. Model fit of the strong invariant longitudinal model was very good ($\chi^2_{(243)}$ = 366.86, p < .001, CFI = .97, RMSEA = .02, SRMR = .05), and the difference in CFI versus the configural model (i.e., loadings and intercepts freely estimated) was below the .01 threshold recommended by Cheung and Rensvold (2002). A strong invariance test of this sort indicates constructs that are comparable across time – observed changes are true construct changes and not due to measurement error (Little, 2013). We created scale scores of each construct using the unstandardized CFA loadings. In all subsequent mediation models (reported in section 4.1) a latent variable for each construct was specified with a single observed scale score indicator, the variance of which was fixed at each construct's calculated measurement error variance.

2.5. Student reports of motivation and engagement outcomes

Mastery motivation. The degree to which students had a goal to develop competence and understanding of presented learning tasks was assessed in the fall and spring via a 3-item scale drawn from PALS (Midgley et al., 2000). The scale showed good reliability in the fall (α = .73) and spring (α = .81). Items included "One of my goals in class is to learn as much as I can," "It's important to me that I improve my skills this year," and "It's important to me that I thoroughly understand my class work". Responses were on a 5-point Likert scale (1 = *not at all true* and 5 = *very true*). The intra-class correlation coefficient (ICC), or amount of variance in students' mastery motivation attributable to the classroom was .06.

Behavioral engagement. A 5-item scale drawn from Wellborn's (1991) behavioral engagement and disaffection scales showed good reliability in the fall (α = .68) and the spring (α = .76). Scale items included "I try hard to do well in this class", "When I'm in this class, I participate in class discussions", "I pay attention in this class", "When I'm in this class, I listen very carefully", and "In this class, I do just enough to get by". Responses were on a 5-point Likert scale (1 = *not at all true* and 5 = *very true*), and the ICC was .11.

2.6. Analytic approach

Analyses were conducted using MPlus 7.11 (Muthén & Muthén, 2013). Full-information maximum likelihood estimation was utilized, and prior to estimation we assessed whether missingness was due to specific teacher or student characteristics. Incomplete data varied depending on the source. Complete video data was available for 63 of the 68 study teachers. Of the remaining teachers, four of five completed at least two recordings and one teacher did not complete any recordings. Analyses with and without this latter classroom included did not alter the pattern of results. Fifty-five of the consented students (5.7%) did not complete a student assessment at any of the time points. Because no significant differences were found in mean comparisons between these students and the rest of the sample on gender, poverty status, or ethnicity, they were included in the main analysis.

2.6.1. Model specification

To assess *relative changes* in motivation and engagement, all models included fall student reports of the three outcomes as controls. We estimated mediation models (see Figs. 1–3) using multilevel structural equation modeling (Preacher, Zyphur, & Zhang, 2010), which allows for the estimation of the size of the indirect path and use bootstrapping procedures for the confidence intervals of the indirect effect when working with nested data (MacKinnon, Fairchild, & Fritz, 2007). In addition to the fall measures of the outcome variables, all models also controlled for a student's *fall measures of the mediator variables* as well as their ethnicity, gender, free and reduced lunch status, and prior year achievement. Classroom-level controls included indicators for whether the teacher was in the intervention group, academic subject, and whether the classroom was in a middle or high school. To test whether results were driven by intervention status, we re-estimated models using multiple group analysis (0 = control classroom; 1 = intervention classroom).

3. Results

Descriptive statistics and correlations among the student-report measures are presented in Table 2, and indicated moderate stability in fall to spring mastery motivation and behavioral engagement ($r = .43$, and $r = .51$, respectively). Students' winter reports of experiences of autonomy, peer relatedness, and competence beliefs were significantly correlated with their spring reports of mastery motivation and behavioral engagement. Winter mediators had slightly higher correlations with behavioral engagement than with mastery motivation, and autonomy showed the lowest overall mean in fall and winter. Baseline models indicated significant associations between observed fall ES ($M = 4.70$, $SD = .51$) and the spring student-reported outcomes.

3.1. Mediational analyses

We estimated multilevel models separately testing the indirect effects of each of the three proposed mediators on students' self-reported mastery motivation and behavioral engagement. In addition to student demographic information and teacher and classroom controls, all models control for the fall measures of the mid-year mediators and end of year outcomes.

3.1.1. Winter peer relatedness as a mediator

Results from the peer relatedness model are shown in Fig. 1 ($\chi^2 = 84.76$, $p < .01$; CFI = .95; RMSEA = .04). Significant direct effects were found between fall ES and winter peer relatedness ($\beta = .16$). Likewise, direct effects between winter peer relatedness and spring behavioral engagement ($\beta = .23$) and spring mastery motivation ($\beta = .21$) were significant. Indirect pathways explaining the prediction of fall ES to spring outcomes through winter peer relatedness were significant for engagement, indirect = .08 [CI = .04, .11] and mastery motivation, indirect = .06 [CI = .02, .09]. After accounting for the peer relatedness indirect pathway in the full structural equation model, only the direct association between fall ES and student-reported behavioral engagement remained significant. In addition to controls for a student's ethnicity, gender, free and reduced lunch status, and prior year achievement, the model in Fig. 1 also accounted for whether a teacher was randomly assigned to receive the coaching treatment as part of the original study. To further test whether the indirect effect varies as a function of treatment, we estimated a follow-up multiple group analysis, which indicated no significant treatment-control differences in the indirect effect of peer relatedness.

3.1.2. Winter autonomy as a mediator

Fig. 2 displays results for the model with winter autonomy as the mediator ($\chi^2 = 93.17$, $p < .01$; CFI = .94; RMSEA = .07). Direct effects were significant between fall ES and the winter autonomy mediator ($\beta = .15$). Significant direct links were similarly observed between winter autonomy and students' spring reports of behavioral engagement ($\beta = .21$) and mastery motivation ($\beta = .16$). The indirect pathways linking fall ES to spring outcomes through winter autonomy were significant for behavioral engagement, indirect = .06 [CI = .03, .10], and mastery motivation, indirect = .04 [CI = .01, .07]. When modeling all indirect and direct effect pathways simultaneously with covariates, only the direct association between fall ES and student-reports of behavioral engagement continued to be significant. A follow-up multiple group analysis indicated no significant differences in the indirect effect between classrooms of control and intervention teachers.

3.1.3. Winter competence beliefs as a mediator

Results with winter competence beliefs as the mediator are shown in Fig. 3 ($\chi^2 = 99.58$, $p < .01$; CFI = .93; RMSEA = .08) and indicated a non-significant direct effect between fall ES and the winter competence beliefs mediator ($\beta = .09$). Direct links were

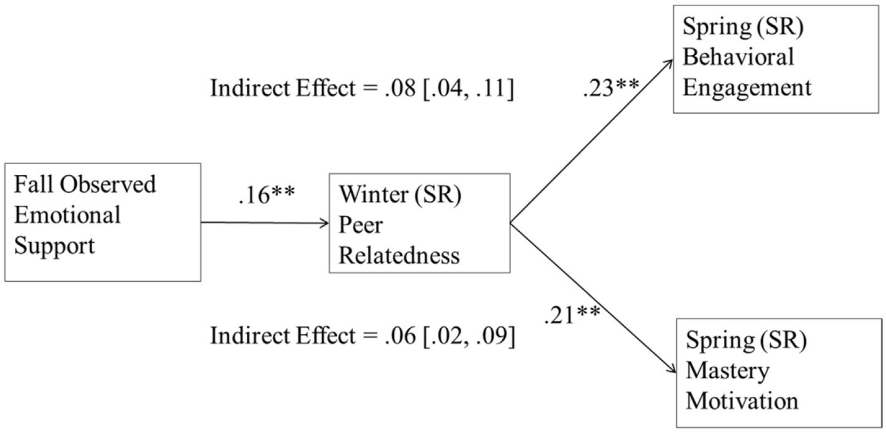

Fig. 1. Winter peer relatedness experiences (student-reported [SR]) as a mediator of emotionally-supportive teacher instruction on SR engagement and motivation. Control variables include fall mediator and outcome measures and demographic and prior achievement measures. **p < .01.

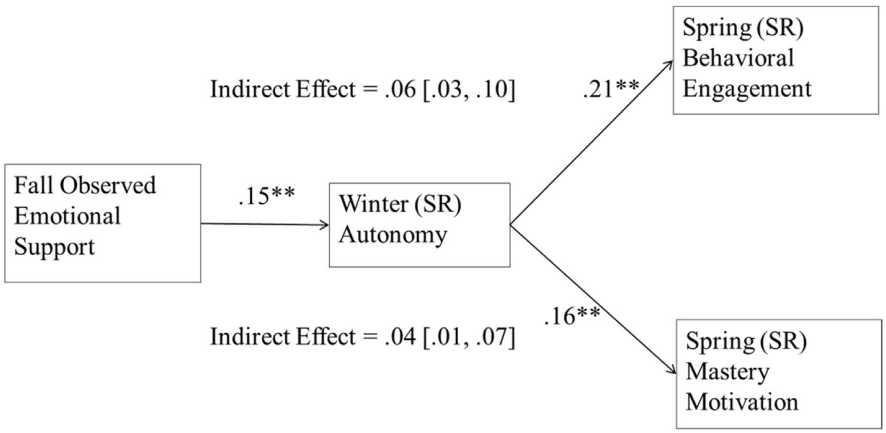

Fig. 2. Winter autonomy experiences (student-reported [SR]) as a mediator of emotionally-supportive teacher instruction on SR engagement and motivation. Control variables include fall mediator and outcome measures and demographic and prior achievement measures. **p < .01.

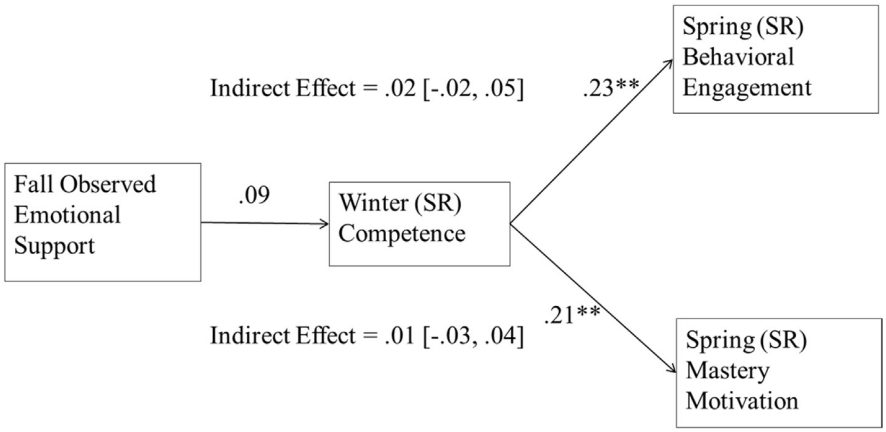

Fig. 3. Winter competence beliefs (student-reported [SR]) as a mediator of emotionally-supportive teacher instruction on SR engagement and motivation. Control variables include fall mediator and outcome measures and demographic and prior achievement measures. **p < .01.

Table 2
Means, standard deviations, and correlations among student-report variables.

Variable	1	2	3	4	5	6	7	8	9	*M*	*SD*
1) Fall autonomy	–									2.87	.87
2) Fall peer relatedness	.13*	–								4.11	.66
3) Fall behavioral engagement	.20*	.23*	–							3.96	.66
4) Fall mastery motivation	.17*	.19*	.51*	–						4.43	.7
5) Fall academic competence beliefs	.18*	.22*	.47*	.40*	–					4.23	.71
6) Winter autonomy	.47*	.10*	.16*	.16*	.19*	–				2.87	.95
7) Winter peer relatedness	.14*	.46*	.15*	.17*	.16*	.17*	–			4.03	.7
8) Winter academic competence beliefs	.13*	.23*	.35*	.22*	.50*	.27*	.28*	–		4.21	.8
9) Spring behavioral engagement	.20*	.21*	.51*	.35*	.31*	.25*	.28*	.45*	–	3.89	.8
10) Spring mastery motivation	.12*	.21*	.40*	.43*	.29*	.17*	.25*	.40*	.68*	4.27	.87

Note. N = 960 students. *p < .01.

observed between winter competence beliefs and spring student-reported behavioral engagement (β = .23) and mastery motivation (β = .21). Indirect pathways explaining the prediction of fall ES to spring outcomes through winter autonomy were non-significant for engagement, indirect = .02 [CI = −.02, .05], and mastery motivation, indirect = .01 [CI = −.03, .04]. The pattern of results did not change in the multiple group treatment-control follow-up.

3.1.4. Post-hoc multiple mediator model

Although not shown, a post-hoc multiple mediation model tested the simultaneous indirect effects of all three mediators on outcomes. Results (available from the first author) indicated that the total indirect effect for both behavioral engagement and mastery motivation was significant, indirect = .09 [CI = .06, .13]. Further, the specific indirect effect for peer relatedness experiences continued to significantly explain some of the impact of ES on behavioral engagement (indirect = .05) and mastery motivation

(indirect = .04), while autonomy support and perceived competence indirect pathways to outcomes were non-significant.

3.2. Robustness of results

The larger intervention project from which data for this study was drawn occurred over two academic years. However, all analyses in section 3.1 were carried out on first year study data. To test the robustness of the results, we re-estimated models in Figs. 1–3 on year two data, when study teachers instructed different groups of students (and were not being coached). Direct and indirect effect estimates were similar in size and significance as those reported for year one data.

We tested the directionality of associations reported in section 4.1 by specifying models in which mediator and outcome variables were reversed. For example, one model specified winter mastery motivation as a mediator of the pathway from fall ES to spring autonomy support. If mastery-motivated students report higher autonomy support, we would expect to find that winter motivation fully accounts for any association between fall ES and spring autonomy and relatedness. This was not the case either for mastery motivation or behavioral engagement. The year two and reverse directionality results provide greater confidence in the findings.

4. Discussion

Building on prior research on the role of teacher emotional support in motivating and engaging students (e.g., Eccles & Wang, 2014; Patrick et al., 2007; Reyes et al., 2012; Ryan & Patrick, 2001; Skinner et al., 2008) we tested whether these associations are explained by classroom experiences targeted at meeting autonomy, relatedness, and competence needs. Students' mid-year reports of their classroom experiences of autonomy and peer relatedness partially accounted for positive academic year changes in students' mastery motivation and behavioral engagement in highly emotionally-supportive classrooms. This mediational pathway was not found for students' competence beliefs.

4.1. The positive academic effects of positive peer relatedness experiences

The importance of peers and peer relationships cannot be overstated (Hartup, 1982; Martin & Dowson, 2009; Wentzel, 2005). While peer influence is often viewed in terms of more negative outcomes (e.g., drinking, risky behavior, or deviance), a long line of research suggests that the values espoused by one's peers and the sense of connection one feels to peers relate to positive social pursuits and goals (Wentzel, 1998, 2002), school interest (Wentzel et al., 2010), and motivation (Anderman & Anderman, 1999; Nelson & DeBacker, 2008; Ryan, 2001). Peers may help support one's pursuit of positive academic and social goals through encouragement, leading by example, and emotional support when failure arises (Patrick et al., 2004; Wentzel, 2005). Accordingly, teachers may want to harness the power of peers for promoting positive aspects of students' academic experiences. In the present study we found that through their emotionally-supportive interactions with students, teachers create experiences that lead students to perceive that their peers are supportive, positive, and respectful. Untested is whether the more affective aspects of peer relationships (e.g., caring, warmth) play a similar mediational role in educational settings. Future research on the influence of classrooms on students' motivation should not undervalue the role of peers and peer relationships in promoting positive outcomes.

4.2. The uncertain role of competence beliefs

Despite direct associations between students' mid-year competence beliefs and changes in the two outcomes, the mechanism through which emotionally-supportive teacher-student interactions promote students' engagement and mastery motivation was unrelated to teachers' ability to create experiences that promoted their students' competence beliefs. Competence beliefs might be more influenced by teachers' instructional interactions with students, as opposed to the socio-emotional interactions measured here. Competence beliefs might also be more difficult to change than perceptions of autonomy and relatedness, requiring both relevant environmental influences and direct evidence that one is more competent than initially believed.

Skinner et al. (2008) examined the need components of self-determination (self-systems) theory as mediators of the effect of teacher emotional support (student-reported) on students' engagement. Because competence was not separate from autonomy and teacher relatedness in their analysis, it is unclear which of the three needs most strongly influenced engagement. Our post-hoc analysis suggests that experiences targeted toward promoting positive peer relatedness might play a critical role, but we do not feel firm conclusions should be made from this analysis. Pitting the three types of experiences against each other in a multiple mediation framework is not the best way to address this question. Focusing on factors like emotional support that increase students' experiences of both peer relatedness and autonomy (but not competence beliefs), rather than factors that increase just one of these processes, is beneficial.

4.3. The importance of multiple methods for measuring classroom processes

The vast majority of the literature reviewed for this paper used student surveys to measure students' experiences of classroom instruction. This reflects the view that one's own perspective is the primary determinant of behavior (Fraser & Walberg, 1981). However, because students report on their unique experiences, considerable variability in the prevalence of measured instructional practices is found in survey research. And while of substantive interest (e.g., Kuklinski & Weinstein, 2001; Weinstein, 2008), this variability undermines the reliability of surveys to measure classroom instruction "objectively," or in aggregate (Lam, Ruzek, Schenke, Conley, & Karabenick, 2015; Lüdtke et al., 2008; Miller & Murdock, 2007). Comprehensive approaches to identifying the effect of classroom processes on student outcomes require objective *and* subjective measures (Ruzek & Pianta, 2015).

In this paper, we examined relations between independently-observed classroom climate and students' subjective experiences. Doing so addresses the understudied question of how teachers' interactions with students influence students' perceptions of the classroom (Turner & Meyer, 2000; Urdan & Schoenfelder, 2006). Whereas a handful of studies suggest that observed emotionally-supportive instruction is associated with student engagement (Eccles & Wang, 2014; Reyes et al., 2012), this study suggests the *particular student experiences* that lead to engagement in such classrooms. Students are more behaviorally-engaged (and motivated) in emotionally-supportive classrooms partially because they get more opportunities to act autonomously and have experiences that promote positive peer relationships. By tracking how "objective" classroom climate manifests in students' unique experiences we illuminate the process by which adolescents become behaviorally-engaged and mastery-motivated across an academic year.

4.4. Limitations

Because we allowed teachers to choose when to record their instruction, the range of ES scores might be restricted if teachers only submitted their best clips. If true, our direct and indirect estimates may be slightly conservative. Despite the fact that our mediation models fit well and had significant direct and indirect pathways, it is worth noting that the analyses here are the first to show these particular mediated effects, and further data should be employed to replicate these results in other samples. Although the present analysis was carried out on data from an intervention study, a number of checks were made to ensure our results were not a function of treatment assignment. Our mediators measure the extent to which students have classroom experiences targeted at meeting their needs for autonomy, having positive peer relationships, and having strong self-perceptions of their competence. Accordingly, this study does not directly test self-determination theory's conception of need fulfillment as a mediating mechanism. Future research in this area could shed light on whether it is students' experiences or need satisfaction that is most strongly associated with changes in motivation and engagement.

4.5. Conclusion

The approach we take to understanding processes by which emotional support engages and motivates students at school is twofold: 1) use self-determination theory to guide choices about the relevant student experiences that might promote engagement and motivation; and 2) pair objective observations of the classroom with students' subjectively-reported experiences. This approach led us to firstly confirm that adolescent students report being more engaged in classrooms where teachers are observed to be more emotionally-supportive (Eccles & Wang, 2014; Reyes et al., 2012; Skinner et al., 2008), and become more motivated toward competence in such classrooms. Secondly, we identified the motivationally-salient experiences that students in these classrooms report having. Students are afforded more opportunities to exercise autonomy in their day-to-day activities and are more likely to report having positive and supportive relationships with their peers, but do not report higher levels of competence beliefs. The autonomy and peer experiences account for, in part, associations between teacher emotional support and students' changing engagement and mastery motivation. Results suggest a suite of practices that teachers can employ in their classrooms to motivate and engage their adolescent students.

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References

Ames, C. (1992). Classrooms: goals, structures, and student motivation. *Journal of Educational Psychology, 84*(3), 261–271. http://dx.doi.org/10.1037/0022-0663.84.3.261.

Anderman, L. H. (2003). Academic and social perceptions as predictors of change in middle school students' sense of school belonging. *The Journal of Experimental Education, 72*(1), 5–22. http://dx.doi.org/10.1080/00220970309600877.

Anderman, L. H., & Anderman, E. M. (1999). Social predictors of changes in students' achievement goal orientations. *Contemporary Educational Psychology, 24*(1), 21–37. http://dx.doi.org/10.1006/ceps.1998.0978.

Assor, A., Kaplan, H., & Roth, G. (2002). Choice is good, but relevance is excellent: autonomy-enhancing and suppressing teacher behaviours predicting students' engagement in schoolwork. *British Journal of Educational Psychology, 72*(2), 261–278. http://dx.doi.org/10.1348/000709902158883.

Bandura, A. (1997). *Self-efficacy: The exercise of control* (Vol. ix). New York, NY: W. H. Freeman/Times Books/Henry Holt & Co.

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497–529. http://dx.doi.org/10.1037/0033-2909.117.3.497.

Benita, M., Roth, G., & Deci, E. L. (2014). When are mastery goals more adaptive? It depends on experiences of autonomy support and autonomy. *Journal of Educational Psychology, 106*(1), 258–267. http://dx.doi.org/10.1037/a0034007.

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal, 9*(2), 233–255. http://doi.org/10.1207/S15328007SEM0902_5.

Ciani, K. D., Middleton, M. J., Summers, J. J., & Sheldon, K. M. (2010). Buffering against performance classroom goal structures: the importance of autonomy support and classroom community. *Contemporary Educational Psychology, 35*(1), 88–99. http://dx.doi.org/10.1016/j.cedpsych.2009.11.001.

Cicchetti, D. V., & Sparrow, S. A. (1981). Developing criteria for establishing interrater reliability of specific items: applications to assessment of adaptive behavior. *American Journal of Mental Deficiency, 86*(2), 127–137.

Connell, J. P., & Wellborn, J. G. (1991). Competence, autonomy, and relatedness: a motivational analysis of self-system processes. In M. R. Gunnar, & L. A. Sroufe (Eds.), *Self processes and development* (pp. 43–77). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Cooper, K. S. (2013). Eliciting engagement in the high school classroom: a mixed-methods examination of teaching practices. *American Educational Research Journal*. http://dx.doi.org/10.3102/0002831213507973, 0002831213507973.

Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: the self-determination perspective. *Educational Psychologist, 26*(3–4), 325–346.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*, 256–273.

Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., et al. (1993). Development during adolescence: the impact of stage-environment fit on young adolescents' experiences in schools and in families. *American Psychologist, 48*(2), 90–101. http://dx.doi.org/10.1037/0003-066X.48.2.90.

Eccles, J. S., & Wang, M. (2014). *The direct and indirect effects of classroom climate on student engagement and achievement in math* (Manuscript submitted for publication).

Fast, L. A., Lewis, J. L., Bryant, M. J., Bocian, K. A., Cardullo, R. A., Rettig, M., et al. (2010). Does math self-efficacy mediate the effect of the perceived classroom environment on standardized math test performance? *Journal of Educational Psychology, 102*(3), 729–740. http://dx.doi.org/10.1037/a0018863.

Fraser, B. J., & Walberg, H. J. (1981). Psychosocial learning environment in science classrooms: a review of research. *Studies in Science Education, 8*(1), 67–92. http://dx.doi.org/10.1080/03057268108559887.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: potential of the concept, state of the evidence. *Review of Educational Research, 74*(1), 59–109. http://dx.doi.org/10.3102/00346543074001059.

Furrer, C., & Skinner, E. (2003). Sense of relatedness as a factor in children's academic engagement and performance. *Journal of Educational Psychology, 95*(1), 148–162. http://dx.doi.org/10.1037/0022-0663.95.1.148.

Goodenow, C. (1993). The psychological sense of school membership among adolescents: scale development and educational correlates. *Psychology in the Schools, 30*(1), 79–90. http://dx.doi.org/10.1002/1520-6807(199301)30:1<79::AID-PITS2310300113>3.0.CO;2-X.

Greene, B. A., Miller, R. B., Crowson, H. M., Duke, B. L., & Akey, K. L. (2004). Predicting high school students' cognitive engagement and achievement: contributions of classroom perceptions and motivation. *Contemporary Educational Psychology, 29*(4), 462–482. http://dx.doi.org/10.1016/j.cedpsych.2004.01.006.

Hafen, C. A., Allen, J. P., Gregory, A., Mikami, A. Y., Hamre, B., & Pianta, R. C. (2012). The pivotal role of autonomy in secondary school classrooms. *Journal of Youth and Adolescence, 41*, 245–255. http://dx.doi.org/10.1007/s10964-011-9739-2.

Hamre, B. K., & Pianta, R. C. (2010). Classroom environments and developmental process. In J. L. Meece, & J. S. Eccles (Eds.), *Handbook of research on schools, schooling and human development* (pp. 25–41). New York, NY: Routledge.

Hartup, W. W. (1982). Peer relations. In C. B. Kopp, & J. B. Krakow (Eds.), *The child: Development in a social context* (pp. 514–575). Reading, MA: Addison-Wesley.

Jang, H., Reeve, J., & Deci, E. L. (2010). Engaging students in learning activities: It is not autonomy support or structure but autonomy support and structure. *Journal of Educational Psychology, 102*(3), 588–600. http://dx.doi.org/10.1037/a0019682.

Kaplan, A., & Maehr, M. L. (2007). The contributions and prospects of goal orientation theory. *Educational Psychology Review, 19*, 141–184. http://dx.doi.org/10.1007/s10648-006-9012-5.

Kegan, R. (1994). *In over our heads*. Cambridge, MA: Harvard University Press.

Kuklinski, M. R., & Weinstein, R. S. (2001). Classroom and developmental differences in a path model of teacher expectancy effects. *Child Development, 72*(5), 1554–1578. http://dx.doi.org/10.1111/1467-8624.00365.

Lam, A. C., Ruzek, E. A., Schenke, K., Conley, A. M., & Karabenick, S. A. (2015). Student perceptions of classroom achievement goal structure: Is it appropriate to aggregate? *Journal of Educational Psychology, 107*(4), 1102–1115. http://dx.doi.org/10.1037/edu0000028.

Lee, J.-S. (2014). The relationship between student engagement and academic performance: Is it a myth or reality? *The Journal of Educational Research, 107*(3), 177–185. http://dx.doi.org/10.1080/00220671.2013.807491.

Little, T. D. (2013). *Longitudinal structural equation modeling*. New York: The Guilford Press.

Lüdtke, O., Marsh, H. W., Robitzsch, A., Trautwein, U., Asparouhov, T., & Muthén, B.

(2008). The multilevel latent covariate model: a new, more reliable approach to group-level effects in contextual studies. *Psychological Methods, 13*(3), 203–229. http://dx.doi.org/10.1037/a0012869.

MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation analysis. *Annual Review of Psychology, 58*, 593. http://dx.doi.org/10.1146/annurev.psych.58.110405.085542.

Martin, A. J., & Dowson, M. (2009). Interpersonal relationships, motivation, engagement, and achievement: yields for theory, current issues, and educational practice. *Review of Educational Research, 79*(1), 327–365. http://dx.doi.org/10.3102/0034654308325583.

Midgley, C., Maeher, M. L., Hruda, L. Z., Anderman, E., Anderman, L., Freeman, K. E., et al. (2000). *Manual for the patterns of adaptive learning scales (PALS)*. Ann Arbor, MI: University of Michigan.

Mikami, A. Y., Boucher, M. A., & Humphreys, K. (2005). Prevention of peer rejection through a classroom-level intervention in middle school. *Journal of Primary Prevention, 26*(1), 5–23. http://dx.doi.org/10.1007/s10935-004-0988-7.

Miller, A. D., & Murdock, T. B. (2007). Modeling latent true scores to determine the utility of aggregate student perceptions as classroom indicators in HLM: the case of classroom goal structures. *Contemporary Educational Psychology, 32*(1), 83–104. http://dx.doi.org/10.1016/j.cedpsych.2006.10.006.

Murdock, T. B., & Miller, A. (2003). Teachers as sources of middle school students' motivational identity: variable-centered and person-centered analytic approaches. *Elementary School Journal, 103*(4), 383. http://dx.doi.org/10.1086/499732.

Muthén, B. O., & Muthén, L. K. (2013). *Mplus (Version 7.11)* [Computer Software]. Los Angeles, CA: Muthén & Muthén.

National Research Council. (2004). *Engaging Schools: Fostering high school students' motivation to learn*. Retrieved from http://www.nap.edu/catalog.php?record_id=10421.

Nelson, R. M., & DeBacker, T. K. (2008). Achievement motivation in adolescents: the role of peer climate and best friends. *The Journal of Experimental Education, 76*(2), 170–189. http://dx.doi.org/10.3200/JEXE.76.2.170-190.

Nicholls, J. G. (1984). Achievement motivation: conceptions of ability, subjective experience, task choice, and performance. *Psychological Review, 91*(3), 328–346. http://dx.doi.org/10.1037//0033-295X.91.3.328.

Niemiec, C. P., & Ryan, R. M. (2009). Autonomy, competence, and relatedness in the classroom: applying self-determination theory to educational practice. *Theory and Research in Education, 7*(2), 133–144. http://dx.doi.org/10.1177/1477878509104318.

Patrick, H., Anderman, L. H., & Ryan, A. M. (2004). Social motivation and the classroom environment. In C. Midgley (Ed.), *Goals, goal structures, and patterns of adaptive learning* (pp. 85–108). Malwah, NJ: Lawrence Erlbaum Associates.

Patrick, H., Ryan, A. M., & Kaplan, A. (2007). Early adolescents' perceptions of the classroom social environment, motivational beliefs, and engagement. *Journal of Educational Psychology, 99*(1), 83–98. http://dx.doi.org/10.1037/0022-0663.99.1.83.

Pianta, R. C., & Allen, J. P. (2008). Building capacity for positive youth development in secondary school classrooms: changing teachers' interactions with students. In M. Shinn, & H. Yoshikawa (Eds.), *Toward positive youth development: Transforming schools and community programs* (pp. 21–39). Oxford University Press.

Pianta, R. C., & Hamre, B. K. (2009). Conceptualization, measurement, and improvement of classroom processes: standardized observation can leverage capacity. *Educational Researcher, 38*(2), 109–119. http://dx.doi.org/10.3102/0013189X09332374.

Pianta, R. C., Hamre, B. K., Hayes, N., Mintz, S., & LaParo, K. M. (2011). *Classroom assessment scoring system - Secondary (CLASS-S)*. Charlottesville, VA: University of Virginia.

Preacher, K. J., Zyphur, M. J., & Zhang, Z. (2010). A general multilevel SEM framework for assessing multilevel mediation. *Psychological Methods, 15*(3), 209–233. http://dx.doi.org/10.1037/a0020141.

Reeve, J. (2006). Teachers as facilitators: what autonomy-supportive teachers do and why their students benefit. *The Elementary School Journal, 106*(3), 225–236. http://dx.doi.org/10.1086/esj.2006.106.issue-3.

Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students and how they can become more autonomy supportive. *Educational Psychologist, 44*(3), 159–175. http://dx.doi.org/10.1080/00461520903028990.

Reeve, J., & Jang, H. (2006). What teachers say and do to support students' autonomy during a learning activity. *Journal of Educational Psychology, 98*(1), 209–218. http://dx.doi.org/10.1037/0022-0663.98.1.209.

Reeve, J., Jang, H., Hardre, P., & Omura, M. (2002). Providing a rationale in an autonomy-supportive way as a strategy to motivate others during an uninteresting activity. *Motivation and Emotion, 26*(3), 183–207. http://dx.doi.org/10.1023/A:1021711629417.

Reyes, M. R., Brackett, M. A., Rivers, S. E., White, M., & Salovey, P. (2012). Classroom emotional climate, student engagement, and academic achievement. *Journal of Educational Psychology, 104*(3), 700–712. http://dx.doi.org/10.1037/a0027268.

Roorda, D. L., Koomen, H. M. Y., Spilt, J. L., & Oort, F. J. (2011). The influence of affective teacher–student relationships on students' school engagement and achievement: a meta-analytic approach. *Review of Educational Research, 81*(4), 493–529. http://dx.doi.org/10.3102/0034654311421793.

Ruzek, E. A., & Pianta, R. C. (2015). The value of using observational and student report methodologies in classroom research. In C. M. Rubie-Davies, J. M. Stephens, & P. Watson (Eds.), *The Routledge international handbook of social psychology of the classroom* (pp. 231–241). New York, NY: Routledge.

Ryan, A. M. (2001). The peer group as a context for the development of young adolescent motivation and achievement. *Child Development, 72*(4), 1135–1150. http://dx.doi.org/10.1111/1467-8624.00338.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68–78. http://dx.doi.org/10.1037/0003-066X.55.1.68.

Ryan, R. M., & Grolnick, W. S. (1986). Origins and pawns in the classroom: self-report and projective assessments of individual differences in children's perceptions. *Journal of Personality and Social Psychology, 50*(3), 550–558. http://dx.doi.org/10.1037/0022-3514.50.3.550.

Ryan, A. M., & Patrick, H. (2001). The classroom social environment and changes in adolescents' motivation and engagement during middle school. *American Educational Research Journal, 38*(2), 437–460. http://dx.doi.org/10.3102/00028312038002437.

Sakiz, G., Pape, S. J., & Hoy, A. W. (2012). Does perceived teacher affective support matter for middle school students in mathematics classrooms? *Journal of School Psychology, 50*(2), 235–255. http://dx.doi.org/10.1016/j.jsp.2011.10.005.

Skinner, E. A., & Belmont, M. J. (1993). Motivation in the classroom: reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology, 85*(4), 571–581. http://dx.doi.org/10.1037/0022-0663.85.4.571.

Skinner, E., Furrer, C., Marchand, G., & Kindermann, T. (2008). Engagement and disaffection in the classroom: Part of a larger motivational dynamic? *Journal of Educational Psychology, 100*(4), 765–781. http://dx.doi.org/10.1037/a0012840.

Stefanou, C. R., Perencevich, K. C., DiCintio, M., & Turner, J. C. (2004). Supporting autonomy in the classroom: ways teachers encourage student decision making and ownership. *Educational Psychologist, 39*(2), 97–110. http://dx.doi.org/10.1207/s15326985ep3902_2.

Turner, J. C., & Meyer, D. K. (2000). Studying and understanding the instructional contexts of classrooms: using our past to forge our future. *Educational Psychologist, 35*(2), 69–85. http://dx.doi.org/10.1207/S15326985EP3502_2.

Urdan, T., & Schoenfelder, E. (2006). Classroom effects on student motivation: goal structures, social relationships, and competence beliefs. *Journal of School Psychology, 44*(5), 331–349. http://dx.doi.org/10.1016/j.jsp.2006.04.003.

Weinstein, R. S. (2008). Schools that actualize high expectations for all youth: theory for setting change and setting creation. In M. Shinn, & H. Yoshikawa (Eds.), *Toward positive youth development: Transforming schools and community programs* (pp. 81–101). Oxford University Press.

Wellborn, J. G. (1991). *Engaged and disaffected action: The conceptualization and measurement of motivation in the academic domain*. New York: University of Rochester.

Wentzel, K. R. (1998). Social relationships and motivation in middle school: the role of parents, teachers, and peers. *Journal of Educational Psychology, 90*(2), 202–209. http://dx.doi.org/10.1037/0022-0663.90.2.202.

Wentzel, K. R. (2002). Are effective teachers like good parents? Teaching styles and student adjustment in early adolescence. *Child Development, 73*(1), 287–301. http://dx.doi.org/10.1111/1467-8624.00406.

Wentzel, K. R. (2005). Peer relationships, motivation, and academic performance at school. In A. J. Elliot, & C. S. Dweck (Eds.), *Handbook of competence and motivation* (pp. 279–295). New York, NY: The Guiliford Press.

Wentzel, K. R., Baker, S. A., & Russell, S. L. (2012). Young adolescents' perceptions of teachers' and peers' goals as predictors of social and academic goal pursuit. *Applied Psychology, 61*(4), 605–633. http://dx.doi.org/10.1111/j.1464-0597.2012.00508.x.

Wentzel, K. R., Battle, A., Russell, S. L., & Looney, L. B. (2010). Social supports from teachers and peers as predictors of academic and social motivation. *Contemporary Educational Psychology, 35*(3), 193–202. http://dx.doi.org/10.1016/j.cedpsych.2010.03.002.

Wigfield, A., Eccles, J. S., Schiefele, U., Roeser, R. W., & Davis-Kean, P. (2006). Development of achievement motivation. In W. Damon, & N. Eisenberg (Eds.), *Handbook of child psychology* (6th ed., pp. 933–1002). Hoboken, NJ, US: John Wiley & Sons, Inc. Retrieved from http://onlinelibrary.wiley.com/doi/10.1002/9780470147658.chpsy0315/abstract.

Wubbels, T., & Brekelmans, M. (2005). Two decades of research on teacher–student relationships in class. *International Journal of Educational Research, 43*(1–2), 6–24. http://dx.doi.org/10.1016/j.ijer.2006.03.003.