

RESEARCH ARTICLE

# Effects of developmental relationships with teachers on middle-school students' motivation and performance

Peter C. Scales<sup>1</sup>  | Martin Van Boekel<sup>2</sup> | Kent Pekel<sup>1</sup> | Amy K. Syvertsen<sup>1</sup> | Eugene C. Roehlkepartain<sup>1</sup>

<sup>1</sup>Search Institute, Minneapolis, Minnesota

<sup>2</sup>Department of Educational Psychology, University of Minnesota, Minneapolis, Minnesota

## Correspondence

Peter C. Scales, Search Institute, 940 Chestnut Ridge Road, Manchester, MO 63021.  
Email: [scalespc@searchinstitute.org](mailto:scalespc@searchinstitute.org)

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## Abstract

We examined how middle-school students' motivation, belonging, school climate, and grade point average (GPA) are affected by students experiencing developmental relationships—those that go beyond teachers being caring (e.g., showing warmth to students) and providing challenge (e.g., high expectations) to also include teachers providing support, sharing power, and expanding students' sense of possibilities. We also examined variations in those associations by student socioeconomic status (SES). The study included 534 diverse Grades 6–8 students (51% female, 46% non-White, 33% eligible for free and reduced price meals). Structural equation modeling and regressions showed that students with better developmental relationships with their teachers had better outcomes. Developmental relationships strongly predicted academic motivation at both the beginning and end of the school year, and also directly predicted students' sense of belonging and school climate. Relationships indirectly predicted GPA, through motivation. Student–teacher relationship quality for low-SES students was lower and declined more than for other students. The results both reflect current literature in showing the importance of strong student–teacher relationships, and extend it in showing the worsening relationships quality for low-income students, and in suggesting that strengthening multiple facets of student–teacher developmental relationships may

have important effects on motivation and achievement of middle-school students.

#### KEYWORDS

academic motivation, developmental relationships, middle-school students, student–teacher relationships

## 1 | INTRODUCTION

Teachers across the United States, especially those in schools in which a majority of students are low-income, commonly report low student academic motivation as the number one problem in their classroom (Bridgeland, Bruce, & Hariharan, 2013; Yeager et al., 2014). Motivation has been defined as “a set of interrelated desires, goals, needs, values, and emotions that explain the initiation, direction, intensity, persistence, and quality of behavior” (Wentzel & Miele, 2016, p. 1). Although some students become more motivated over time, studies have repeatedly shown that, on average, students’ academic motivation declines steadily as they progress from elementary through high school (Gnamb & Hanfstingl, 2016; Kosovich, Flake, & Hulleman, 2017; Lepper, Henderlong Corpus, & Iyengar, 2005), especially in middle school. In addition, this downward trajectory in motivation is steeper for boys, students of color, and less-affluent students (Skinner, Kindermann, Connell, & Wellborn, 2012).<sup>1</sup> Teachers also report parallel declines in their own self-efficacy beliefs, that is, secondary teachers report feeling less efficacious than elementary teachers (Eccles et al., 1993; A. J. Elliot & Dweck, 2005).

These declines in motivation matter because research consistently shows that student academic motivation is positively associated with increased effort (R. Ryan & Connell, 1989), greater perseverance (e.g., Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002), and better academic performance (Lazowski & Hulleman, 2016). Moreover, the declines in teacher self-efficacy add to the problem, given the positive relation between teacher self-efficacy and students’ academic performance (Zee & Koomen, 2016).

### 1.1 | Theoretical and intervention approaches to academic motivation

Scholars increasingly note that motivation is more than just shaped by contextual influences such as relationships (e.g., Urdan & Schoenfelder, 2006): Student–teacher relationships may be *foundational* for motivation, and therefore deserving of primary emphasis (e.g., Lazowski & Hulleman, 2016; Wentzel & Wigfield, 2007). For example, Pianta, Hamre, and Allen (2012) claim that “the central problem in school reform” (p. 368) is the need for stronger student–teacher relationships.

<sup>1</sup>Motivation may decline more for low-income youth for several reasons. Youth from low-income families are more likely to attend schools with the least resources and the least qualified teachers (Clements & McIntyre, 2004). Teachers in schools with at least one-third to one-half of students being low income, and with high percentages of students of color also have been found to have less belief in their own efficacy with those students, and to resort more to emphasis on drills and memorization than meaning and understanding in their teaching practices (Delpit, 2012; Lynn et al., 2010). Although memorization and drills can be effective pedagogical methods for acquiring a “rich body of knowledge” (National Research Council, 2000), they tend not to be as conducive to continued student engagement as strategies such as project-based learning, cooperative learning, and more intellectually challenging exercises in critical thinking. Both basic memorization and higher-order thinking skills are necessary to promote engagement, deep understanding, and knowledge transfer to new situations (National Research Council, 2000), but the basic skills approach alone usually does not achieve those aims. For example, in a longitudinal study of preschoolers followed through fifth grade (Crosnoe et al., 2010), children with initially low math skills narrowed the achievement gap if they experienced inference-based instruction, but not if they received exclusively basic skills instruction. Importantly for the purposes of the current study, the salutary effects of using higher-order teaching practices were only observed when students’ relationships with their teachers were not high in conflict. Thus, pedagogy is important, but pedagogy interacting with student–teacher relationships is pivotal for motivation and achievement.

Efforts to boost student motivation have not ignored relationships as a mechanism, but have often focused on changing the individual student's *internal* attitudes, values, and self-perceptions (e.g., efficacy beliefs and mindsets), what DiPerna (2006) called "academic enablers." For example, in their extensive review on achievement motivation, Wigfield et al. (2015) described several group, classroom, and school-based motivation interventions, with the focuses including malleable intelligence, developing self-efficacy and deeper appreciation for the relevance of the subject matter, and changing the overall school structure from a performance orientation to a mastery orientation, with none of the interventions explicitly targeting student–teacher relationships in a broader sense. Interventions targeting students at such individual levels have had a considerable impact on student success (e.g., Farrington et al., 2012; Yeager & Dweck, 2012). But even those not explicitly naming "relationships" as a focus include some attention to how teachers' practices and styles affect students' beliefs and mindsets. For example, in their review of six major social-cognitive theories (including self-determination theory) that they describe as having "driven" motivation research for the last several decades, A. J. Martin and Dowson (2009) noted that even when relationships are not "explicit and central" in each theory, "there is often a clear relevance for interpersonal relationships" (p.332) in achievement motivation research.

Thus, relationships are at the core of most interventions and theories of motivation, even though they are not always made explicit in motivational theory, such as in mindsets theory. The preponderance of research suggests that motivation is driven by needs articulated in self-determination theory (R. M. Ryan & Deci, 2000), the organizing theory of the current paper, specifically students' needs "to feel competent, positively related to others, and autonomous" (Pianta et al., 2012, p. 372). Self-determination theory has been an influential motivation theory precisely because it melds a strong explicit emphasis on relatedness together with the intra-individual strengths like autonomy and competence that other motivational theories more explicitly focus on. In Lazowski and Hulleman's (2016) meta-analysis of motivation interventions, self-determination theory was the explicit theoretical framework of the most papers, a close second only to attribution theory, and yet one could also argue that most of the other dozen theoretical frameworks included also focus on one of those three core accents of self-determination theory.

Marsh et al. (2019), for example, note that competency self-beliefs are "central in theoretical models of motivation" (p. 332). Similarly, Flunger, Mayer, and Umbach (2019) found that an autonomy-supportive teaching style (e.g., offering students choices and providing rationales for tasks) was linked to better need satisfaction, self-regulated learning, and positive emotions about achievement among ninth grade German physics students. Tessier, Sarrazin, and Ntoumanis (2010) showed that a teacher training explicitly based on self-determination theory could improve teachers' autonomy support, structure, and interpersonal involvement with students, with resulting improvement in students' psychological need satisfaction and self-reported class engagement. Cheon, Reeve, Lee, and Lee (2018) also showed a program to increase teachers' autonomy-supportive teaching style was linked to improved student motivation, in part through how teachers' own sense of teaching efficacy increased over the life of the program.

## 1.2 | The role of student–teacher relationships in motivation

There is a considerable body of work about the role of student–teacher relationships in student academic motivation, with most studies focusing on one or both of two major aspects of those relationships, teacher expressions of their caring about students (projecting warmth, and/or providing social support, or promoting feelings of trust in their students), and teachers challenging students to grow, as when they communicate high expectations for students' performance (as reviewed in, e.g., Roorda, Koomen, Spilt, & Oort, 2011; Wentzel, 2002). Teacher–student relationships convincingly contribute to student motivation and achievement, including grades, test scores, and reduction of dropout (Bernstein-Yamashiro & Noam, 2013; Cornelius-White, 2007; Kannapel & Clements, 2005; Lee, 2012; Wang, 1990; Wentzel, 2012). As Wentzel's (2012) extensive research review found, teacher communications and expectations, willingness to provide help, advice, and instruction, and emotional support and safety were related to students' motivation, engagement, and achievement, with the effects greater for low-income students, students of color, and under-achieving students. Teacher–student relationships are malleable

and can produce changes in student motivational and academic outcomes within a single school year (Gehlbach, Brinkworth, & Harris, 2012; Niehaus, Rudasill, & Rakes, 2012). This timeframe is important, since the vast majority of secondary school students spend no more than a year with any given teacher, meaning—from a practice perspective—that teachers have a year to leverage their relationship to positively impact their students.

Despite the documented malleability and influence of teacher–student relationships on student motivation and achievement, robust teacher–student relationships are too rare among secondary school students. For example, a study of more than 89,000 students found that only a minority of students experience even the most fundamental relational dimension: caring. Only 35% of students reported a “caring” school climate (Benson, Scales, & Syvertsen, 2011), and just 22% experienced *both* a caring school climate *and* high expectations from teachers (Benson, Scales, et al., 2011; Scales, 2013). Furthermore, the quality of teacher–student relationships tends to decline across educational transitions to middle and high school (Roorda, et al., 2011; Wehlage, Rutter, Smith, Lesko, & Fernandez, 1989). Compounding the challenge, students growing up in low-income families are less likely than other students to have high-quality relationships with teachers. For example, Fitzpatrick, Côté-Lussier, Pagani, and Blair (2015) found that kindergarten children perceived by their teachers as disadvantaged were 32% less likely to report positive relationships with their teachers several years later when they were in the fourth grade.

### 1.3 | How do relationships with teachers influence student motivation?

Among the mechanisms for how motivation might be strengthened, A. J. Martin and Dowson (2009) concluded from their comprehensive review of the literature that relational experiences that help students satisfy belongingness needs produce positive emotional responses that energize student achievement, in terms of how they respond to challenges, how much they participate, and their degree of self-regulation. They noted, too, how strong student–teacher relationships have been shown to promote both agency (related to self-determination theory’s construct of competence) and cooperation (reflective of belonging and relatedness), and that the integration of autonomy and relatedness has been an influential thread within motivational theory.

Similarly, Patrick, Turner, and Strati (2016) review numerous studies showing how theories of intrinsic motivation are centrally concerned with the self-determination theory constructs of autonomy, belongingness, and competence. In their relationship with students, for example, how teachers communicate their expectations of students’ abilities has profound long-term results. For instance, teachers’ over- or under-estimation of students’ first-grade abilities in math, reading, and language skills predict their performance on standardized tests in those domains at age 15, with the effect of expectations even stronger for students from low-income backgrounds (Sorhagen, 2013). Thus, the research suggests that a teacher’s relationships with students promote motivation by positively affecting students’ perceptions about their own agency and competence, and their connectedness to teachers.

Based on this literature, in the current study, we use a social-cognitive theoretical approach, in which motivation is promoted and shaped within the context of relationships (see Lazowski & Hulleman, 2016 and A. J. Martin & Dowson, 2009 for summaries). As Patrick et al. (2016) noted, a core premise of the social-cognitive approach is that motivation is shaped by students’ perceptions of themselves and their environment, including how they and important others view their competence and abilities.

In this conceptualization, a student’s academic motivation is expressed through such variables as the effort they exert, how much their mindsets are oriented to growth or are representations of fixed ability, and the kinds of goals they set, and all of these are seen as heavily influenced by the nature and quality of the relationships they have. Teachers, counselors, and other school staff who praise the achievement of outcomes or how “bright” students are, for example, may nurture in many students a sense that their effort is irrelevant, because their intelligence is set from birth and resistant to change (Yeager & Dweck, 2012). Teachers who promote a mastery orientation in which mistakes are seen as an inevitable part of learning, and who try to connect students’ schoolwork with their own personal life interests, on the other hand, may nurture in those students an enjoyment

of learning for its own sake, a belief that they can always learn more, and that hard work and study can help them succeed academically (Wubbels & Brekelmans, 2005).

Moreover, following the tenets of self-determination theory, students who perceive teachers and counselors as giving them appropriate autonomy and support to develop valued competencies will likely also be drawn toward deeper connection with those adults, striving to please them and valuing their example and mentorship (Reeve, 2006; Roorda et al., 2011). Thus, the quality of the student–teacher relationship, as reflected in the kinds of practices teachers employ instructionally and in setting classroom norms and climate, can promote motivation and striving, or depress them.

## 1.4 | Gaps in the student–teacher relationships literature

There are a number of gaps in the student–teacher relationships literature, most notably a content gap in which only a limited number of relational constructs dominate the literature, and a methods gap in which the most commonly used measures do not ask for students' own perspectives.

### 1.4.1 | The content gap

Most studies also have focused on the affective aspects of student–teacher relationships and/or on teacher's expectations (e.g., review in Roorda, 2011; Wubbels & Brekelmans, 2005). Gehlbach et al. (2016), for example, reported that student motivation and grades improved, especially among African American and Latinx students, when teachers believed that they and their students shared similar values and interests. Perceived similarity led to improved student–teacher relationships, which led to increased motivation. There are some exceptions of studies that use a more comprehensive measure of relationships (e.g., Kirk, Lewis, Brown, Karibo, & Park, 2016; Murray & Zvoch, 2011; Wallace, Kelcey, & Ruzek, 2016). Even then, however, the conceptual representation of quality relationships is fairly limited. For example, Murray and Zvoch (2011) measured three dimensions of student–teacher relationships—communication, trust, and alienation. Pianta and colleagues developed a relationship-strengthening intervention—My Teaching Partner–Secondary—that uses videos and consultation to strengthen three relationship domains of emotional support, classroom organization, and instructional support (U.S. Department of Education, 2015). Overall, constructs such as caring, warmth, and trust, also described as social support, are more common in the student–teacher relationships literature, whereas relational dimensions such as scaffolding students to exert greater power in the relationship, or helping students expand their sense of possibilities for their lives are less common (Murray & Zvoch, 2011; Wentzel, 2012).

Wentzel (2012) wrote that “Models that examine multiple dimensions of teacher-student relationships provide a more complex and complete picture of the interpersonal context that teachers create for their students than those that focus exclusively on the affective quality of teacher-student relationships” (p. 309). But because of this focus on a limited number of relational constructs in the literature, relatively few studies (particularly at the secondary school level) have utilized the kind of multidimensional approaches that Wentzel recommended. For example, Cherg's (2017) study of student–teacher relationships had the strength of being a nationally representative sample, but provided limited insight because it only measured relational quality with three items: teacher reports of how well they knew a student, whether they thought the student was withdrawn or passive, and whether they talk at all outside of class.

### 1.4.2 | The methods gap

Moreover, some of the most commonly used measures of student–teacher relationships do not directly obtain student perceptions but rely instead on teacher report or observational approaches (e.g., D. P. Martin &

Rimm-Kaufman, 2015; Pianta et al., 2012 [Classroom Assessment Scoring System-Secondary]; Pianta & Stuhlman, 2004 [Student Teacher Relationship Scale]).

In addition, most studies have examined those relationships cross-sectionally, or observed the trajectory over multiple years, but few studies focus on how the link between relationships and motivation changes over the course of an academic year (see Gehlbach et al., 2012, for an exception), which is the more common timeframe over which teachers and students can develop and deepen their relationship.

Finally, some studies have suggested that student–teacher relationships may be more important for the school success of low-income students and students of color (see review in Roorda et al., 2011) but more studies are needed. For example, a study using the National Center for Education Statistic's Education Longitudinal study found that high school students were much more likely to graduate from college if their teacher had high expectations of them, but that secondary teachers have lower expectations for students of color and low-income students (Boser, Wilhelm, & Hanna, 2014). In particular, nonminority teachers have been found to have lower expectations for low-income students and students of color (Gershenson, Holt, & Papageorge, 2016; Lynn, Bacon, Totten, Bridges, & Jennings, 2010). But in general, other than the relational aspects of teacher expectations and teacher caring, more is known about variations in *achievement* by the socioeconomic condition than is known about how students' *relationships* with teachers may vary as a function of students' socioeconomic status (SES).

## 1.5 | Contributions of the current study

As reviewed earlier, the literature on student–teacher relationships largely emphasizes how teachers can promote caring interaction while also challenging students to stretch intellectually and embrace difficult subject matter (Roorda, et al., 2011; Wubbels & Brekelmans, 2005). Care and challenge clearly are key aspects of high-quality student–teacher relationships, but as Li and Julian (2012) noted, “emotional connection is necessary, but insufficient to account for the totality of how a developing person is relating to others in her community” (p. 2). Additional relational experiences are necessary to transform a relationship from being merely positive to being truly developmental, in the sense of having the potential to substantively affect the trajectory of young people's growth in a sustained manner over time and across contexts, and in particular, to stimulate, maintain, and grow the kind of academic motivation needed for students to exert full effort and persevere in the face of struggle.

The current study contributes to the literature in addressing the content gap by investigating the role of this more comprehensive multidimensional construct of student–teacher *developmental relationships* on academic motivation, engagement, and performance. Specifically, this study adds two elements to the typically studied constructs of caring and high expectations (challenge): Sharing power and expanding students' possibilities. Additionally, this framework articulates the element of “provide support” as comprising four distinct actions (Table 1: help students navigate, empower them, advocate for them, and set boundaries for them) in a way that distinguishes it from provision of “social support,” which in previous studies often has been used as a descriptor of caring, warmth, and general positivity (e.g., Aldrup, Klusman, Ludtke, Gollner, & Trautwein, 2018; Johnson, Johnson, Buckman, & Richards, 1985; Malecki & Elliott, 1999). The study also addresses the literature's methods gap by being based on students' own perspectives of relationships, rather than teacher report or observation.

## 1.6 | Research hypotheses

The current study examines over a school year how a broader operationalizing of student–teacher relationships beyond care and challenge affects middle-school students' motivation, sense of belonging and school climate, and grade point average (GPA), and whether these associations vary by SES.

**TABLE 1** The developmental relationships framework

Elements	Actions	Definitions
Express care Show me that I matter to you.	Be dependable Listen Believe in me Be warm Encourage	Be someone I can trust. Really pay attention when we are together. Make me feel known and valued. Show me you enjoy being with me. Praise me for my efforts and achievements.
Challenge growth Push me to keep getting better.	Expect my best Stretch Hold me accountable Reflect on failures	Expect me to live up to my potential. Push me to go further. Insist I take responsibility for my actions. Help me learn from mistakes and setbacks.
Provide support Help me complete tasks and achieve goals.	Navigate Empower Advocate Set boundaries	Guide me through hard situations and systems. Build my confidence to take charge of my life. Stand up for me when I need it. Put in place limits that keep me on track.
Share power Treat me with respect and give me a say.	Respect me Include me Collaborate Let me lead	Take me seriously and treat me fairly. Involve me in decisions that affect me. Work with me to solve problems and reach goals. Create opportunities for me to take action and lead.
Expand possibilities Connect me with people and places that broaden my world.	Inspire Broaden horizons Connect	Inspire me to see possibilities for my future. Expose me to new ideas, experiences, and places. Introduce me to people who can help me grow.

*Note:* Relationships are, by definition, bidirectional, with each person giving and receiving. So each person in a strong relationship both engages in and experiences each of these actions. However, for the purpose of clarity, this framework is expressed from the perspective of one young person.

Given the above theoretical considerations and previous research, we posed two specific hypotheses:

1. Student–teacher developmental relationships will predict middle-school students' academic motivation, both concurrently and longitudinally, with Fall relationship levels predicting Spring motivation. A broader research aim was to examine how these associations might be related to engagement and performance (as measured by sense of belonging, school climate, and GPA);
2. There will be a value-add to these relationships-outcomes associations, that is, beyond the salutary effects of “express care” and “challenge growth,” students will benefit when they experience the additional elements of “provide support,” “share power,” and “expand possibilities.”

We also investigated the influence that students' SES has on these associations, directly, and as a possible moderator. Finally, given the rapid changes in multiple domains of development during early adolescence (Blum, Astone, Decker, & Mouli, 2014; Eccles et al., 1993), we investigated whether these overall links between developmental relationships and educational outcomes differed for students in Grades 6–8.

## 2 | METHOD

### 2.1 | Participants

Sixth, seventh, and eighth grade students ( $n = 534$ ) from a middle school in a large metropolitan suburb in the Midwest, contiguous to a major city, participated in this study. The sample consisted of 51% identifying as female, 47% as male, and

less than 1% as transgender (2% of the students did not respond to this question). In addition, 8% of the sample identified as African American, 7% as Asian or Pacific Islander, 1% as Native American, 54% as White, 9% as mixed race, and 7% as another race or ethnicity (15% of the students did not respond to this question). Students' access to free and reduced price lunch services did not change across the year. School district records indicated that although the school was not a Title I school, a sizeable percentage of students, 33%, did qualify for free and reduced price meals (FRP).

## 2.2 | Procedures

All study procedures and measures received approval from Chesapeake, a private, for-profit IRB not connected to any university. An online survey comprising 81 questions (including eight demographic items), was first administered in October 2016. Informed consent was obtained from all participants. Parents were notified and given the option of withdrawing their child(ren). Students were also asked to assent as participants in the multiple data collections before being allowed access to the survey. About 10 students or parents (1.5%) declined participation. On average, students completed the survey in 15 min on their school-issued Chromebooks. With the exception of the consent/assent process, students completed the online survey using the same procedure again in late May 2017 of that same academic year. These two survey administrations are referred to as Waves 1 and 2, respectively.

## 2.3 | Measures

Sample items for measures are shown in Table 2.

### 2.3.1 | Student–teacher relationships

To identify key relationship elements, we built off of the concept of *developmental* relationships first articulated by Li and Julian. We conducted a broad literature review and pilot research (described in Pekel et al., 2018). We drew on numerous literatures, including theories of human development (e.g., positive youth development, attachment and bonding, resilience, and motivation and self-determination), as well as conducting research across multiple developmental contexts (e.g., parenting and family relationships, student–teacher relationships, and peer relationships). Table 1 describes from the

**TABLE 2** Measures and sample items

Developmental relationships	<p>My teachers really listen to me when I talk.</p> <p>My teachers help me discover new things that interest me.</p> <p>My teachers have high expectations for me.</p> <p>When I have a problem at school, my teachers help me figure out who I should talk to for help.</p> <p>My teachers take time to consider my ideas when making decisions.</p>
Academic motivation	<p>My main reason for working hard in school is to learn new knowledge and skills.</p> <p>I can get smarter by working hard.</p> <p>I am confident in my ability to complete my schoolwork.</p> <p>I am good at working toward the goals I set.</p> <p>I have plans for my future.</p>
Belonging	<p>I feel like a real part of my school.</p> <p>I feel part of a community at this school.</p>
School climate	<p>Students are disciplined fairly at this school.</p> <p>Teachers at this school really care about me.</p>

perspective of the student the five major elements of developmental relationships emerging from the literature and our early studies: Express care, challenge growth, provide support, share power, and expand possibilities.

As noted above, our literature review suggested that the first two of these, and the construct of “social support,” are commonly measured in both previous studies on student–teacher relationships (e.g., Wentzel, 2009) and the broader school climate research (e.g., Cohen, McCabe, Michelli, & Pickeral, 2009). Share power and expand possibilities are uncommon in student–teacher relationships research but are consistent features of research and theoretical work on social capital provision for youth, especially marginalized youth (Stanton-Salazar, 2011) and on what comprises a successful mentoring relationship (Rhodes, Spencer, Keller, Liang, & Noam, 2006), with these emphases providing theoretical rationale for their inclusion in the developmental relationships framework. Similarly, although social support has been included in student–teacher relationship studies, it is often essentially measured as a variant of warmth or closeness, instead of as specific actions teachers take to help students reach their goals. As Table 1 shows, this study sharpens that definition of providing support.

We assessed these student–teacher relationships using 20-items tapping how common it was for students to experience features of high relational quality reflecting expressions of care (5 items), provisions of support (4), challenging students to grow (4), sharing of power (4), and expanding of their possibilities (3). Each item is scored on a 5-point rating scale from Never to Very Often, or for some items, from Not at All Like My Teachers to Very Much Like My Teachers. The items were newly created by the authors and tested across several studies of families, schools, and peer relationships before use in the current study (all described in Pekel et al., 2018). The internal consistency of the subscales was consistently acceptable over the two waves (Table 3).

The literature suggests that the five elements are both connected (correlated with each other) and distinct (reflecting distinguishable aspects of interactions) (reviewed above and see also reviews in A. J. Martin & Dowson, 2009; Roorda et al., 2011; Wentzel, 2012). This seems also to be the case statistically in our study. The five developmental relationships subscales were correlated from the 0.50 to 0.80 with each other across the two waves (Table 4). This suggests that although they share meaningful variance, from 25% to 64%, there is also a meaningful *unshared* variance of 36–75%, which supports them as being distinguishable from each other. Our qualitative work with focus groups of students and interviews with teachers also strongly suggested that students do not always experience the five elements as separate entities, but in various combinations, with, for example, a teacher setting high expectations also being considered to demonstrate their caring for the student in so challenging them (Scales, Pekel, Sethi, Chamberlain, & Van Boekel, 2019). Thus, there is substantial support in the literature and the intercorrelation results for conceptualizing these elements as separate subscales, but that same evidence and our qualitative results support considering them to be moderately to highly interrelated. Thus, for most of our analyses, such as for predicting motivation from developmental relationships, we used the overall developmental relationships score, but for the specific analysis of examining the value-add of students experiencing a greater number of the five elements, we utilized the separate subscales, because a unidimensional variable could not address that specific research question about the value-add of specific relational elements. In the interests of empirical parsimony, for most of the analyses, we created a latent developmental relationships factor made up of the five elements. The average scores from each of the five elements were used to create a unidimensional factor, *developmental relationships*. Because the theoretical framework of student–teacher developmental relationships involving these five elements is extensively supported in the literature (see the multiple citations above), we had specific hypotheses to test, and therefore, conducting an EFA was both unnecessary and inappropriate, per the guidelines elaborated by Costello and Osborne (2005). Accordingly, we conducted a repeated-measures confirmatory factor analysis (CFA; Little, 2013) and the results yielded acceptable model fit indices (shown in Table 5).

### 2.3.2 | Academic motivation

This study focused specifically on academic motivation, operationalizing and measuring two broad areas, each of which includes several specific measures. *Effort* focuses on whether students have a growth or fixed mindset, whether they

**TABLE 3** Descriptive statistics of scores on academic motivation and developmental relationship subconstructs, SES, GPA, and perceptions of school climate and belonging.

Measure	Subconstruct	Wave 1 (Term 1—October 16, 2017)				Wave 2 (Term 2—March 17, 2018)				Wave 2 (Term 3—May 17, 2018)			
		n	M	SD	$\alpha$	n	M	SD	$\alpha$	n	M	SD	$\alpha$
Developmental relationships	Express care	534	3.72	0.84	0.86	533	3.72	0.81	0.81	533	3.52	0.91	0.89
	Challenge growth	534	3.97	0.64	0.62	534	3.80	0.76	0.77	534	3.80	0.76	0.77
	Provide support	534	3.62	0.81	0.79	532	3.44	0.96	0.84	532	3.44	0.96	0.84
	Share power	534	3.41	0.75	0.73	534	3.33	0.83	0.79	534	3.33	0.83	0.79
	Expand possibilities	534	3.09	0.97	0.75	531	3.03	1.01	0.82	531	3.03	1.01	0.82
Academic motivation	Mastery/performance orientation	533	3.92	0.76	-	533	3.72	0.81	-	533	3.72	0.81	-
	Belief in malleable intelligence	534	4.02	0.72	0.72	531	3.93	0.81	0.80	531	3.93	0.81	0.80
	Academic self-efficacy	534	3.90	0.70	0.75	533	3.82	0.81	0.83	533	3.82	0.81	0.83
	Goal orientation	532	3.71	0.88	0.77	530	3.70	0.87	0.79	530	3.70	0.87	0.79
	Internal locus of control	534	3.95	0.61	0.66	534	3.88	0.73	0.79	534	3.88	0.73	0.79
Belonging		534	3.68	0.84	0.81	532	3.50	0.89	0.84	532	3.50	0.89	0.84
School climate		534	3.50	0.79	0.78	532	3.35	0.87	0.83	532	3.35	0.87	0.83
GPA		531	3.34	0.59	-	531	3.26	0.71	-	530	3.23	0.71	-
SES proxy		492	0.85	1.09	-	492	0.81	1.06	-	492	0.81	1.06	-

Abbreviations: SES, socioeconomic status; SD, standard deviation.

**TABLE 4** Correlations between developmental relationships elements

	Wave 1					Wave 2				
	EC	CG	PS	SP	EP	EC	CG	PS	SP	EP
Express care										
Challenge growth	0.67					0.76				
Provide support	0.79	0.65				0.82	0.72			
Share power	0.79	0.63	0.72			0.83	0.73	0.81		
Expand possibilities	0.70	0.55	0.64	0.70		0.74	0.60	0.76	0.77	

Note: All correlations are significant at the .001 level.

emphasize a mastery or performance orientation, and academic self-efficacy. These constructs focus on the extensive body of research that shows that the way students view their own intelligence, for example, whether they consider that effort can help them become smarter (growth mindset) or whether their intelligence is set from birth (fixed mindset) has a powerful influence on the effort they put into in school (C. Dweck & Master, 2009). *Aspirations* includes an orientation toward setting goals and internal locus of control. These dimensions of motivation emphasize students' sense that they have control over their own future (Damon, 2008; Yeager & Dweck, 2012; Yeager et al., 2014).

Effort and aspirations reflect intra-individual strengths such as autonomy and competence, but these do not develop independent of young people's relationships, including students' relationships with teachers. Thus, our measure of academic motivation was based on Wentzel and Miele's (2016) multidimensional definition of motivation and consisted of five scales reflecting dominant theories of motivation: mastery/performance orientation (2 items, e.g., A. J. Elliot & Church, 1997), belief in malleable intelligence (3 items, e.g., C. S. Dweck, 2015), academic self-efficacy (3 items, e.g., Midgley et al., 2000), goal orientation (3 items, e.g., Wentzel & Wigfield, 2009), and internal locus of control (4 items, e.g., Shepherd, Owen, Fitch & Marshall, 2006). Some of the motivation items were answered on a 5-point Strongly Disagree to Strongly Agree scale, some on a 5-point Not at All Like Me to Very Much Like Me scale, and some on a 5-point Not at All True of Me to Very True of Me response scale. Although these items were informed by reviews of these theories, they were newly developed for this study. The internal consistency of the measure was consistently acceptable over the two waves (see Table 3). The latent academic motivation factor made up of the five components had an acceptable model fit indices (CFA results shown in Table 5).

### 2.3.3 | Belonging and school climate

School climate (4 items) and belonging (3 items). The belonging and school climate measures are informed by the extensive literature in those areas (e.g., Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2013) but consist of items newly created by the authors for previous research. Both constructs were modeled separately as unidimensional factors. Both measures were responded to on 5-point Strongly Disagree to Strongly Agree response scales. The internal consistencies of the scales were consistently acceptable over the two waves (see Table 3). Table 6 also shows that the CFAs and measurement invariance for both constructs were acceptable (although the three-item Belonging measure's results should be viewed cautiously, because it was just-identified).

### 2.3.4 | SES

Our primary SES indicator was a dichotomous yes-no variable from the district's records of each student's eligibility for FRP. Because a growing body of research points to variability in perceptions of economic adequacy or

**TABLE 5** CFAs and temporal measurement invariance for DR and motivation, Waves 1 and 2

<b>(a) CFA and measurement invariance for total developmental relationships measure (<math>\alpha_{W1} = .91</math>; <math>\alpha_{W2} = .93</math>)</b>					
	<b>Wave 1</b>			<b>Wave 2</b>	
Express care	0.921 (0.009)			0.920 (0.009)	
Challenge growth	0.736 (0.021)			0.803 (0.017)	
Provide support	0.858 (0.014)			0.898 (0.010)	
Share power	0.857 (0.014)			0.914 (0.009)	
Expand possibilities	0.772 (0.019)			0.824 (0.015)	
Model fit indices: $\chi^2 = 93.54$ , $df = 29$ , $p = .000$ ; RMSEA = 0.07; CFI = 0.99; TLI = 0.98; SRMR = 0.03					
<b>Measurement invariance</b>					
	<b>RMSEA</b>	<b>LCL</b>	<b>UCL</b>	<b>CFI</b>	<b><math>\Delta</math>CFI</b>
Configural	0.108	0.086	0.132	0.986	-
Metric	0.096	0.077	0.117	0.984	0.002
Scalar	0.097	0.081	0.115	0.978	0.006
<b>(b) CFA and measurement invariance for total academic motivation measure (<math>\alpha_{W1} = .86</math>; <math>\alpha_{W2} = .90</math>)</b>					
	<b>Wave 1</b>			<b>Wave 2</b>	
Academic self-efficacy	0.749 (0.040)			0.841 (0.027)	
Belief in malleable intelligence	0.736 (0.040)			0.778 (0.033)	
Goal orientation	0.683 (0.045)			0.850 (0.026)	
Internal locus of control	0.803 (0.034)			0.796 (0.032)	
Mastery versus performance orientation	0.711 (0.045)			0.714 (0.041)	
Model fit indices: $\chi^2 = 42.39$ , $df = 29$ , $p = .052$ ; RMSEA = 0.05; CFI = 0.99; TLI = 0.98; SRMR = 0.04					
<b>Measurement invariance</b>					
	<b>RMSEA</b>	<b>LCL</b>	<b>UCL</b>	<b>CFI</b>	<b><math>\Delta</math>CFI</b>
Configural	0.104	0.081	0.128	0.979	-
Metric	0.091	0.072	0.112	0.978	0.001
Scalar	0.089	0.072	0.107	0.971	0.007

Note: All reported factor loading estimates are standardized (SE in parentheses).

Abbreviations: CFA, confirmatory factor analysis; CFI, comparative fit index; DR, developmental relationship; LCL, lower confidence limit; RMSEA, root mean square error of approximation; SE, standard error; SRMR, standardized root mean square residual; TLI, Tucker-Lewis index; UCL, upper confidence limit.

inadequacy as being more predictive of psychological and educational outcomes than measures of income (Conger, Conger, & Martin, 2010; Gershoff, Aber, Raver, & Lennon, 2007), we supplemented FRP status with a single item that asks participants to reflect on their perception of their families' financial strain. Participants responded on a scale from 1 ("We have enough money to buy almost anything we want") to 4 ("We can't buy the things we need sometimes"). As expected, participants' perception of their families' financial strain was positively but modestly related to their school district reported FRP status at both Waves 1 ( $r = .270$ ,  $p < .001$ ) and 2 ( $r = .233$ ,  $p < .001$ ). Results did not meaningfully vary whether using this full composite, FRP alone, or financial strain alone.

**TABLE 6** CFA and measurement invariance for belonging and school climate

CFA model for belonging ( $\alpha_{W1} = .81$ ; $\alpha_{W2} = .84$ )					
	Item no.	STDYX (W1)	STDYX (W2)		
I feel like a real part of my school	1	0.889	0.941		
I can really be myself at this school	2	0.660	0.701		
I feel part of a community at this school	3	0.761	0.775		
Model fit indices: $\chi^2 = 10.80$ , $df = 5$ , $p = .056$ ; RMSEA = 0.05; CFI = 1.00; TLI = 0.99; SRMR = 0.02.					
Belonging—These numbers are unreliable because the model is just-identified					
	RMSEA	LCL	UCL	CFI	$\Delta$ CFI
Configural	0.000	0.000	0.000	1.000	-
Metric	0.000	0.000	0.058	1.000	0.000
Scalar	0.000	0.000	0.069	1.000	0.000
BE2					
BE1	0.638***				
CFA model for school climate ( $\alpha_{W1} = .78$ ; $\alpha_{W2} = .83$ )					
	Item no.	STDYX (W1)	STDYX (W2)		
School staff respect differences of opinion	1	0.695	0.762		
Students are disciplined fairly at this school	2	0.689	0.782		
Teachers at this school really care about me	3	0.766	0.761		
Most students at this school care about each other, even people they do not know well	4	0.612	0.651		
Model fit indices: $\chi^2 = 30.20$ , $df = 15$ , $p = .011$ ; RMSEA = 0.05; CFI = 0.99; TLI = 0.98; SRMR = 0.02.					
School climate					
	RMSEA	LCL	UCL	CFI	$\Delta$ CFI
Configural	0.086	0.049	0.128	0.988	-
Metric	0.060	0.029	0.093	0.990	0.002
Scalar	0.046	0.016	0.075	0.991	0.001
SCLM2					
SCLM1	0.701***				

Abbreviations: CFA, confirmatory factor analysis; CFI, comparative fit index; LCL, lower confidence limit; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual; TLI, Tucker-Lewis index; UCL, upper confidence limit.

\*\*\*All correlations are significant at the \*\*\* $p \leq .001$  level.

### 2.3.5 | School records data

The school participating in this study uses a trimester schedule. Students retain the same teachers and courses across each trimester, except one elective that changes each semester. GPA and free and reduced price lunch eligibility were provided by the school district for three time points over the academic year.

## 2.4 | Analytic plan

To test our hypotheses, two overall structural equation models were executed using MPlus version 7.4 (Muthén & Muthén, 1998–2015). These predicted students' motivation, perception of belonging and school climate, and GPA from school records. We used the following goodness of fit cut offs: comparative fit index (CFI)  $\geq 0.95$ , root mean square error of approximation (RMSEA)  $\leq 0.05$ , and standardized root mean square residual (SRMR)  $\leq 0.08$  (Hancock & Mueller, 2011; Hu & Bentler, 1999). For all analyses full information maximum likelihood estimation was used to estimate the data. To reduce the chances of obtaining a false positive given the high number of statistical tests performed, we used a value of  $p < .01$  to mark statistical significance.

We also conducted a regression analysis to assess the contribution of the relationship variables to explaining the educational outcomes. We specifically examined the change in  $R^2$  achieved by adding provide support, share power, and expand possibilities after first entering the more commonly measured elements of express care and challenge growth, and demographic control variables.

In addition, we examined the effect of SES on the associations between developmental relationships, motivation, belonging, school climate, and GPA, at both the beginning and end of the school year, and both direct effects of SES on the outcome variables as well as the potential role of SES as a moderator of the relationships-outcomes association.

## 3 | RESULTS

Means and standard deviations for all variables can be found in Table 3. The results that follow present the associations between developmental relationships, academic motivation, and each of our measures of engagement and performance independently, as well as the linkage of SES to these associations.

### 3.1 | Extent of student–teacher developmental relationships

Table 3 shows that students averaged about 3.4 out of 5 on experiencing developmental relationships with their teachers. Challenge growth was the most frequently experienced element, but overall, the typical student reported only an “okay” level of quality relationships with their teachers.

### 3.2 | Effect of SES on outcomes

Table 7 shows that SES early in the school year neither directly predicted any of the academic outcomes nor moderated the association of developmental relationships with the outcomes. By the end of the school year, however, students who were eligible for FRP and who reported high levels of financial strain were worse off than more affluent students on their academic motivation, GPA, and belonging, but not worse off on their perception of school climate. Similarly, the relationships–SES interaction term in the spring was not significant for any of the outcomes, suggesting that SES again did not moderate the association between developmental relationships and these outcomes.

At Wave 1, SES was negatively related to academic motivation (standardized  $\beta = -.22$ ,  $p < .001$ ), meaning that students with low SES had lower academic motivation. SES was not significantly related to student–teacher relationships at Wave 1. However, at the end of the year, students with low SES had lower-quality relationships with their teachers than their peers with high SES (standardized  $\beta = -.17$ ,  $p < .001$ ).

Consistent with previous research, we observed a small decline in academic motivation, globally and by individual dimensions, across one academic year, with the exception of goal orientation (Gnamb & Hanfstingl, 2016; Kosovich et al., 2017; Lepper et al., 2005). The declines across the academic year were more pronounced for those students who

**TABLE 7** Path model between DR and listed outcomes, moderated by SES indicator

	Belonging	Belonging 2	GPA term 1	GPA term 2	GPA term 3	Motivation	Motivation 2	School Climate	School Climate 2
DR	1.158***		0.161***	0.164***		1.116***		3.273***	
SES	-0.001		0.000	-0.001		-0.001		0.002	
DR × SES	-0.002		0.000	0.000		0.000		-0.002	
DR2		1.244***			0.195***		1.299***		4.138***
SES2		-0.153**			-0.213***		-0.136**		-0.041
DR2 × SES2		-0.038			-0.019		-0.074		-0.076

Note: The path coefficients reported here are unstandardized. Mplus does not generate standardized coefficients for the type of analyses performed here (which was needed to test for moderation).

Abbreviations: DR, developmental relationship; SES, socioeconomic status.

\*\*\* $p < .001$

\*\* $p < .01$

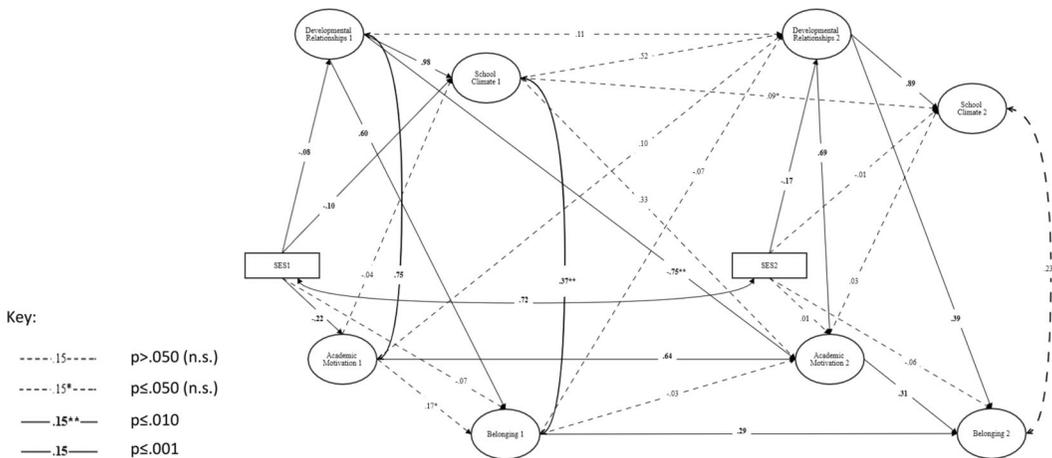
qualified for FRP and also perceived that their family has a high level of financial strain (for space reasons, not shown; available from authors). In fact, among students who did not qualify for FRP and who reported little/no financial strain, that is, more affluent and financially comfortable students, we only observed the expected decline for one of the five components of motivation (mastery/performance orientation). Given that we observed meaningful differences across our four categories of SES, we included this SES proxy variable in the models that follow.

### 3.3 | Associations between developmental relationships and outcomes

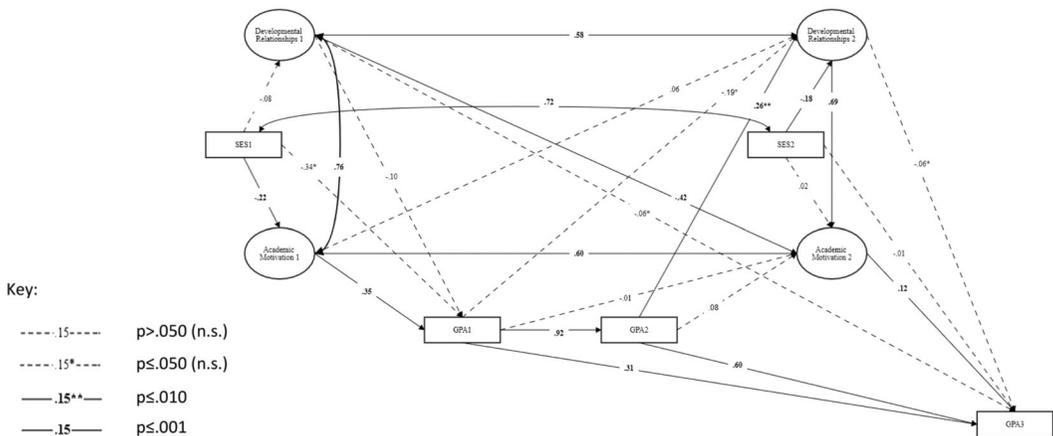
The path model results (Figure 1) show that students with stronger developmental relationships with their teachers had significantly better belonging, school climate, and motivation, at both the beginning and end of the school year, than students with worse developmental relationships. The hypothesized model predicting students' perceptions of belonging and school climate displays adequate fit;  $\chi^2(548) = 1,260.425, p < .001, CFI = 0.95, RMSEA = 0.049 (0.046-0.053), SRMR = 0.039$ . All Figure 1 factor loadings were significant (Wave 1: Developmental Relationships [0.74-0.92], Academic Motivation [0.71-0.79], Belonging [0.64-0.87], School Climate [0.58-0.81]; Wave 2: Developmental Relationships [0.81-0.92], Academic Motivation [0.75-0.84], Belonging [0.66-0.85], School Climate [0.64-82]).

At the beginning of the year, student-teacher developmental relationships predicted students' perceptions of belonging and school climate, but academic motivation did not. At the end of the year, both student-teacher developmental relationships and academic motivation predicted perceptions of belonging, but student-teacher developmental relationships was a much stronger predictor at both time points.

The path model results for GPA (Figure 2) show that students with stronger developmental relationships with their teachers had the significantly better motivation and GPA, at both the beginning and end of the school year, than students with worse developmental relationships. The hypothesized model predicting students' GPA displays adequate fit;  $\chi^2(246) = 640.676, p < .001, CFI = 0.97, RMSEA = 0.055 (0.050-0.060), SRMR = 0.048$ . All Figure 2 factor loadings were significant (Wave 1: Developmental Relationships [0.73-0.92], Academic Motivation [0.71-0.80]; Wave 2: Developmental Relationships [0.80-0.92], Academic Motivation [0.76-0.84]).



**FIGURE 1** Path diagram illustrating the impact of relationships and academic motivation on school climate and belonging controlling for socioeconomic status (SES) across one academic year. All reported estimates are standardized. For both outcomes, the final models, presented in Figures 1 and 2, include correlations among variables within each latent construct at Waves 1 and 2. These correlations were not included in the path diagrams to reduce the overall complexity of the figures. For Figure 1, all Waves 1 and 2 correlations were significant, with one exception, and ranged from 0.13 to 0.36. The manifest variables and their factor loadings on their respective latent variable were not included in the figures to reduce the overall complexity of the path diagrams



**FIGURE 2** Path diagram illustrating the impact of relationships and academic motivation on GPA controlling for socioeconomic status (SES) across one academic year. All reported estimates are standardized. In Figure 2, all of the Waves 1 and 2 correlations were significant and ranged from 0.17 to 0.35

Across the school year, students' reported academic motivation was a good predictor of their GPA. However, student-teacher relationships did not have significant direct effects on GPA across the academic year. The impact of relationships on GPA was observed indirectly through the strong positive association of relationships with academic motivation. As expected, the strongest predictor of GPA at the end of the year was the previous GPA (see Figure 2).

Once again, at the beginning of the school year, SES was significantly related to academic motivation: Higher SES students reported higher levels of academic motivation than their low SES peers. In contrast, the association between student-teacher relationships and SES was not significant. By the end of the school year, higher SES students reported having higher-quality relationships with their teachers. At this point, the association between SES and academic motivation was not significant.

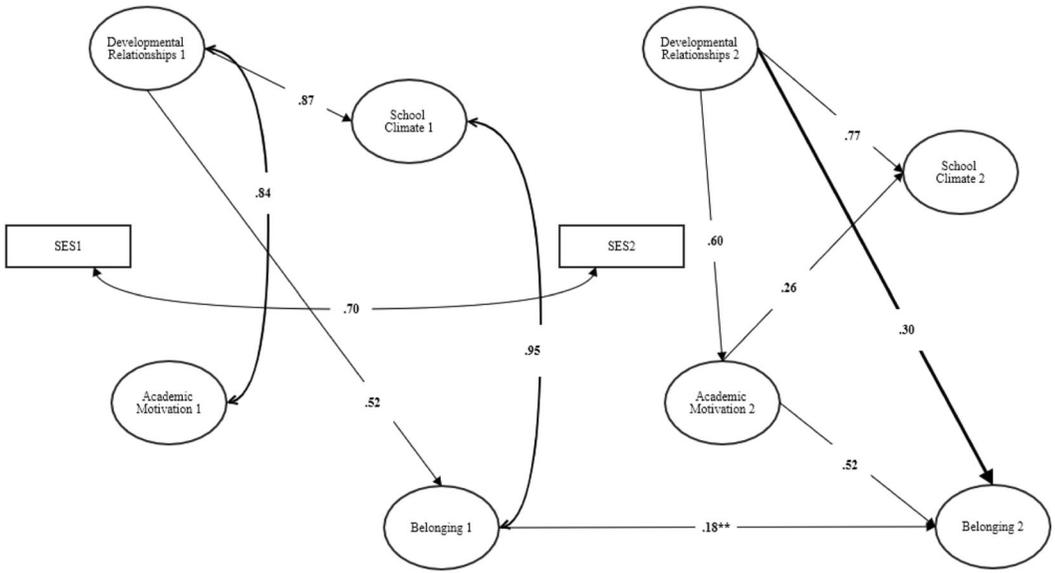
These analyses provide evidence that one means by which SES impacts students' academic success is through their relationships with their teachers, with lower-SES students having worse teacher relationships by the end of the school year.

### 3.4 | Value-add of full versus abbreviated measure of student-teacher relationships

Both the path and regression models suggest there is a value-add in using a full measure to predict belonging, school climate, and GPA that includes provide support, share power and expand possibilities, over and above the relational elements of express care and challenge growth.

For belonging and school climate, among Grade 6 students (but not seventh or eighth grade students) the full model of developmental relationships at Time 2 predicts belonging at Time 2, whereas the abbreviated construct does not (Figure 3). The regression results (Table 8) also showed that the addition of share power predicted belonging at both Waves 1 and 2, school climate at both Waves 1 and Time 2, and motivation at Wave 1. The addition of providing support predicted school climate and motivation at Wave 1, and belonging, school climate, and motivation at Wave 2.

As occurred for belonging and school climate, the path model shows that using the full developmental relationships measure adds value to predicting GPA in Grades 6 and 7, but not in Grade 8 (Figures 4 and 5). For both Grades 6 and 7, developmental relationships at Wave 2 predicts motivation at Wave 2, and motivation predicts GPA. In the model using the abbreviated relationships measure (just express care and challenge growth), the relationships to motivation path is no longer significant at either Grade 6 or 7. Similarly, the regression models in Table 7 also showed that the addition of the



**FIGURE 3** Simplified path diagram illustrating the impact of relationships and academic motivation on school climate and belonging controlling for socioeconomic status (SES) across one academic year for the study sample's Grade 6 students. This is the model depicted in Figure 1, with all nonsignificant paths ( $n.s. = p > .01$ ) removed to reduce visual clutter. The bolded arrows indicate paths that were n.s. when the Developmental Relationships construct is made up of only Express Care and Challenge Growth, but are significant when Provide Support, Share Power, and Expand Possibilities are included

other relational elements adds to the prediction of GPA, albeit only a small amount. That incremental  $R^2$  incorporates a counter-intuitive negative coefficient for expanding possibilities, suggesting that greater student report of teachers expanding their possibilities is associated with lower GPAs.

### 3.5 | Post-hoc analyses

As expected, on average, each of the five elements of student-teacher developmental relationships (i.e., express care, challenge growth, etc.) declined across the academic year, with the exception of expand possibilities. Moreover, low-SES students (eligible for FRP and also reporting financial strain) reported worse relationships with teachers at the beginning of the year than did the most affluent students (not FRL-eligible, and reporting no financial strain), and declined more in their relationships with teachers over the school year than did more affluent students (Table 9). In fact, the three developmental relationships elements that seem to add predictive value to the path and regression models stayed stable for higher SES students: provide support, share power, and expand possibilities, while all declining significantly over the school year for low-SES students.

## 4 | DISCUSSION

This study examined how student-teacher developmental relationships are linked to student motivation, engagement, and performance, how those associations might change over the course of an academic year, and how students' SES affects those linkages. Specifically, our hypotheses were confirmed that middle-school students'

**TABLE 8** Regressions testing value add of full versus abbreviated developmental relationships measures

	Motivation W1	Belonging W1	School climate W1	GPA Term 1	Motivation W2	Belonging W2	School climate W2	GPA Term 2
Female	0.001 (0.044)	-0.035 (0.060)	-0.071* (0.046)	0.171*** (0.064)	0.052 (0.046)	-0.050 (0.064)	-0.014 (0.042)	0.186*** (0.070)
Race (REF:WHITE)								
Black	0.079 (0.092)	0.025 (0.126)	-0.049 (0.095)	-0.061 (0.135)	0.090* (0.097)	0.069 (0.136)	-0.056* (0.089)	-0.072 (0.148)
Asian	-0.002 (0.087)	-0.022 (0.119)	-0.014 (0.090)	0.066 (0.128)	0.053 (0.089)	0.030 (0.125)	-0.021 (0.082)	0.097* (0.137)
Multi-racial	0.037 (0.101)	0.058 (0.139)	0.004 (0.105)	-0.011 (0.148)	-0.108* (0.107)	-0.071 (0.149)	-0.087* (0.098)	-0.034 (0.163)
Other	0.006 (0.088)	-0.042 (0.120)	0.015 (0.091)	-0.149* (0.128)	0.069 (0.091)	0.026 (0.128)	0.048 (0.084)	-0.143* (0.140)
FRL	-0.134** (0.058)	-0.011 (0.080)	-0.021 (0.060)	-0.280*** (0.085)	-0.137*** (0.061)	-0.053 (0.086)	0.033 (0.056)	-0.255*** (0.093)
DR actions W1								
Express care	0.137 (0.052)	0.432*** (0.072)	0.371*** (0.054)	0.124 (0.077)	-0.010 (0.057)	0.112 (0.080)	0.158** (0.052)	0.077 (0.088)
Challenge growth	0.210*** (0.049)	-0.017 (0.067)	-0.046 (0.051)	0.073 (0.072)	-0.007 (0.053)	-0.076 (0.075)	-0.022 (0.049)	0.009 (0.082)
Expand possibilities	-0.006 (0.035)	0.049 (0.048)	0.066 (0.036)	-0.210*** (0.051)	-0.016 (0.039)	0.034 (0.055)	0.008 (0.036)	-0.151* (0.060)
Provide support	0.190** (0.042)	0.099 (0.057)	0.306*** (0.043)	0.109 (0.061)	-0.021 (0.045)	-0.040 (0.064)	-0.078 (0.042)	0.057 (0.070)
Share power	0.235*** (0.053)	0.171** (0.073)	0.203*** (0.056)	0.101 (0.078)	0.039 (0.056)	0.012 (0.078)	0.002 (0.051)	0.046 (0.086)

**TABLE 8** (Continued)

	Motivation W1	Belonging W1	School climate W1	GPA Term 1	Motivation W2	Belonging W2	School climate W2	GPA Term 2
DR actions W3								
Express care					0.251*** (0.058)	0.300*** (0.082)	0.229*** (0.053)	0.194* (0.089)
Challenge growth					0.259*** (0.053)	-0.014 (0.074)	-0.031 (0.048)	-0.004 (0.081)
Expand possibilities					-0.065 (0.041)	0.044 (0.058)	0.030 (0.038)	-0.281*** (0.063)
Provide support					0.255*** (0.051)	0.178* (0.072)	0.504*** (0.047)	0.129 (0.078)
Share power					0.085 (0.061)	0.190* (0.086)	0.141** (0.056)	0.116 (0.094)
Adj. $R^2_{\text{Step 1}}$	0.025	0.004	0.006	0.217	0.050	0.025	0.015	0.240
Adj. $R^2_{\text{Step 2}}$	0.425	0.432	0.602	0.251	0.231	0.230	0.347	0.290
Adj. $R^2_{\text{Step 3}}$	0.459	0.448	0.667	0.268	0.534	0.454	0.672	0.308
Adj. $R^2_{\text{Step 4}}$					0.549	0.478	0.759	0.326

Notes: All coefficients are standardized ( $\beta$ ) (standard error in parentheses).

Step 1 = Demographics

Step 2 = (W1 outcomes) Express care and challenge growth at W1; (W2 outcomes) All DR actions at W2

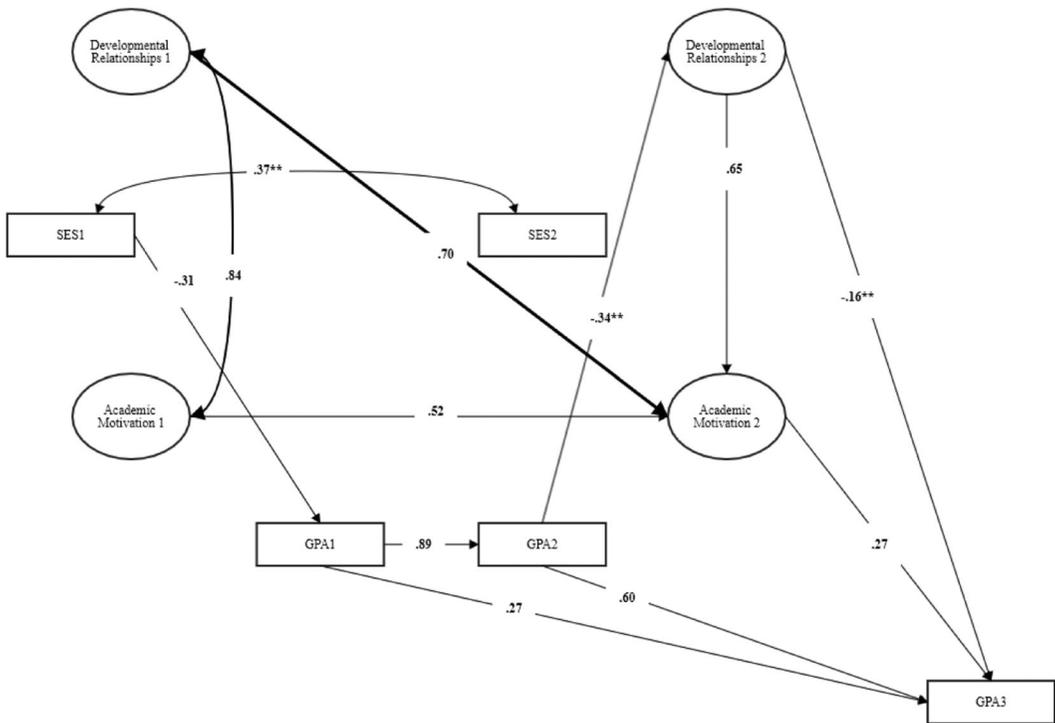
Step 3 = (W1 outcomes) Expand possibilities, provide support, and share power at W1; (W2 outcomes) Express care and challenge growth at W2.

Step 4 = (W2 outcomes only) = Expand possibilities, provide support, and share power at W2.

\* $p \leq .05$ .

\*\* $p \leq .01$ .

\*\*\* $p \leq .001$ .

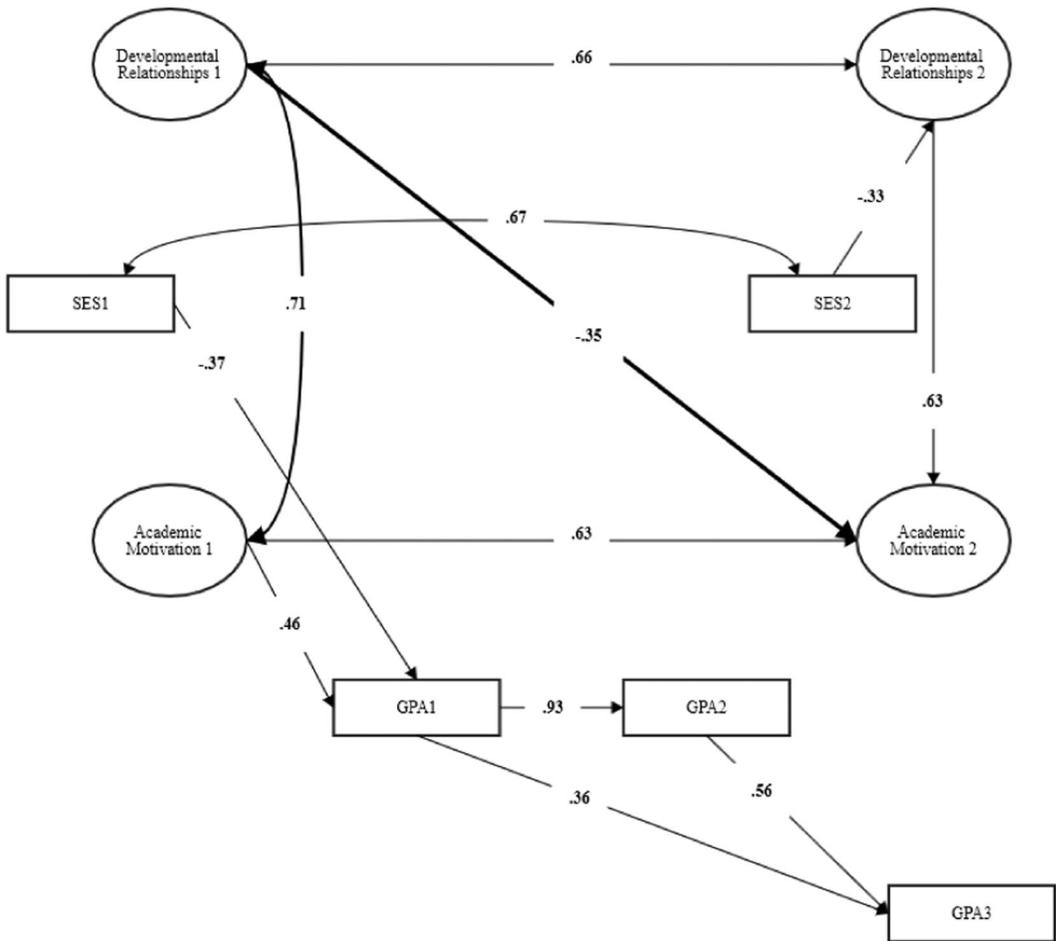


**FIGURE 4** Simplified path diagram illustrating the impact of relationships and academic motivation on GPA controlling for socioeconomic status (SES) across one academic year for the study sample's Grade 6 students. This is the model depicted in Figure 2, with all nonsignificant paths ( $n.s. = p > .01$ ) removed to reduce visual clutter. The bolded arrows indicate paths that were *n.s.* when the Developmental Relationships construct is made up of only Express Care and Challenge Growth, but are significant when Provide Support, Share Power, and Expand Possibilities are included

developmental relationships with teachers were positively linked to their academic motivation, perceptions of belonging and school climate, and their GPA (indirectly, through motivation), and that teacher provision of support, sharing of power with students, and expanding their possibilities adds value to promotion of these outcomes over teacher provision of caring and challenge alone.

The results suggest three important conclusions. First, student–teacher developmental relationships might work in differing ways, depending on the educational outcome in question. Specifically, developmental relationships had stronger direct effects on students' motivation, perceptions of belonging, and school climate, than they did on GPA. When motivation is not included in the model, developmental relationships also have a significant direct effect on GPA, although a smaller one than they do on motivation, belonging, and school climate. But when motivation is included in the model, the effect of developmental relationships on GPA is indirect, through the strong effect of student–teacher relationships on student motivation. Why is this the case? The findings satisfy Baron and Kenny's (1986) criteria for a (partially) mediated association: Relationships strongly predict motivation, relationships predict grades, and motivation strongly predicts grades. But when that middle variable, motivation, is left out, relationships now only weakly predict grades, albeit statistically significantly. The reason student–teacher developmental relationships “work” to produce better grades is because they more directly contribute to better motivation, and it is the motivation that more proximally contributes to the better grades.

One possible explanation for why GPA is more indirectly predicted by developmental relationships is that motivation, belonging and school climate are all outcomes that ultimately are determined by the student's internal



**FIGURE 5** Simplified path diagram illustrating the impact of relationships and academic motivation on GPA controlling for socioeconomic status (SES) across one academic year for the study sample’s Grade 7 students. This is the model depicted in Figure 2, with all nonsignificant paths ( $n.s. = p > .01$ ) removed to reduce visual clutter. The bolded arrows indicate paths that were *n.s.* when the Developmental Relationships construct is made up of only Express Care and Challenge Growth, but are significant when Provide Support, Share Power, and Expand Possibilities are included

assets (values, attitudes, and self-perceptions; Benson, Scales, & Syvertsen, 2011). Even if relationships—student–teacher, student–other adult such as coaches, and student–student—contribute to those internal assets, it is the student, not the teacher or fellow students, who decides whether to be motivated or not, feel connected to school or not, feel welcomed and safe in school or not.

In contrast, grades are ultimately determined by the teacher and involve a combination of both “objective” criteria (scores on tests and other assignments) and relational criteria (the teacher’s perceptions about how hard a student tries, how well-behaved they are, etc.). Moreover, studies have shown that GPA is relatively stable over time (see Scales, Benson, Roehlkepartain, Sesma, & van Dulmen, 2006). Thus, grades may be less directly affected by student–teacher relationships in the relative short term. In addition, standards for grading can vary from teacher to teacher. All those factors in the larger environment make it more complicated to move the needle on grades than on something like a student’s sense of belonging or their perceptions of school climate. Other studies have supported this reasoning that it is more difficult to create an impact on grades and test scores as compared with

**TABLE 9** Comparing Time 1 and 2 student–teacher relationships across time presented for the entire population and SES proxy (at Time 1)

	Entire population				
	<i>F</i>			<i>p</i>	Partial $\eta$
Express care	$F(1, 532) = 33.907$			<.001	0.060
Challenge growth	$F(1, 533) = 32.178$			<.001	0.057
Provide support	$F(1, 531) = 24.034$			<.001	0.43
Share power	$F(1, 533) = 6.638$			.010	0.012
Expand possibilities	$F(1, 530) = 2.296$			.130	0.004
Did not qualify for FRP and did not report financial strain					
	Time 1 <i>M (SD)</i>	Time 2 <i>M (SD)</i>	<i>F</i>	<i>p</i>	Partial $\eta$
Express care	3.76 (0.81)	3.66 (0.86)	$F(1, 266) = 5.106$	.025	0.019
Challenge growth	4.03 (0.56)	3.93 (0.69)	$F(1, 266) = 7.348$	.007	0.027
Provide support	3.66 (0.84)	3.60 (0.91)	$F(1, 266) = 1.507$	.221	0.006
Share power	3.43 (0.72)	3.46 (0.79)	$F(1, 266) = 0.471$	.493	0.002
Expand possibilities	3.02 (0.94)	3.10 (0.98)	$F(1, 265) = 2.049$	.153	0.008
Qualify for FRP and did not report financial strain					
	Time 1 <i>M (SD)</i>	Time 2 <i>M (SD)</i>	<i>F</i>	<i>p</i>	Partial $\eta$
Express care	3.72 (0.82)	3.42 (0.88)	$F(1, 102) = 14.736$	<.001	0.126
Challenge growth	3.92 (0.77)	3.70(0.81)	$F(1, 102) = 8.319$	.005	0.075
Provide support	3.64 (0.93)	3.35 (0.94)	$F(1, 101) = 10.492$	.002	0.094
Share power	3.45 (0.78)	3.25 (0.86)	$F(1, 102) = 6.437$	.013	0.059
Expand possibilities	3.26 (1.03)	3.03 (1.06)	$F(1, 102) = 5.785$	.018	0.054
Did not qualify for FRP and report financial strain					
	Time 1 <i>M (SD)</i>	Time 2 <i>M (SD)</i>	<i>F</i>	<i>p</i>	Partial $\eta$
Express care	3.63 (0.87)	3.31 (0.91)	$F(1, 51) = 5.593$	.022	0.099
Challenge growth	3.91 (0.56)	3.58 (0.79)	$F(1, 51) = 11.839$	<.001	0.188
Provide support	3.49 (0.87)	3.06 (1.03)	$F(1, 51) = 10.707$	.002	0.174
Share power	3.30 (0.74)	3.17 (0.79)	$F(1, 51) = 1.444$	.235	0.028
Expand possibilities	3.02 (0.76)	2.92 (0.94)	$F(1, 51) = 0.686$	.411	0.013
Qualify for FRP and report financial strain					
	Time 1 <i>M (SD)</i>	Time 2 <i>M (SD)</i>	<i>F</i>	<i>p</i>	Partial $\eta$
Express care	3.50 (0.87)	3.11 (0.94)	$F(1, 68) = 15.171$	<.001	0.182
Challenge growth	3.82 (0.64)	3.48 (0.83)	$F(1, 69) = 12.611$	<.001	0.155
Provide support	3.44 (0.90)	3.11 (0.95)	$F(1, 69) = 8.956$	.004	0.115
Share power	3.30 (0.70)	2.96 (0.79)	$F(1, 69) = 18.943$	<.001	0.215
Expand possibilities	3.00 (1.03)	2.73 (0.97)	$F(1, 68) = 5.540$	.021	0.075

Abbreviations: FRP, free and reduced price meals; SES, socioeconomic status; SD, standard deviation.

more psychological and social outcomes. For example, effect sizes for educational interventions generally are smaller for grades and test scores than for social-emotional outcome measures or perceptions of school climate (e.g., meta-analyses in Durlak, Weissberg, Dymnicki, Taylor, & Shellinger, 2011; Roorda et al., 2011).

The final GPA-related result suggested, counterintuitively, that students who reported higher levels of teachers expanding their possibilities had lower GPAs. It is doubtful that teachers providing connections to others who can help students would have the effect of making their performance worse. What may be more likely is that teachers may be providing more of this kind of help with their lower-achieving students, so the negative association is an artifact of them actually being responsive and trying to do more for those students. These teachers might not have seen their higher-achieving students as needing more help making those connections, because those students may already be well-connected (or teachers believe that they are) to various additional forms of social capital. Additional research is needed to support the validity of this possible explanation.

Second, we found that although SES does not seem to moderate the association of developmental relationships with outcomes, it is still important, with lower SES negatively associated with both relationships and motivation. We found that FRP students have less academic motivation at the start of the school year and similar quality of relationships with their teachers as non-FRP (higher SES) students. However, by the end of the year, the effect of SES on motivation is not significant, but lower SES students now have *lower-quality* relationships with their teachers, and lower-quality relationships are linked to lower end of year GPA. In addition, when both FRP status and students' perceptions of financial strain were used to measure SES (in contrast to FRP alone), the lowest-SES students then did have worse relationships with teachers at *both* the beginning and end of the school year.

A great deal of research has demonstrated a link between SES and the outcomes in the current study. Our results show that the direct path is not significant, but it has its impact through developmental relationships, both at the beginning and end of the year when using a composite objective (FRP status) and subjective (perceived financial strain) measure of SES, and through relationships at the end of the year when using FRP alone. Regardless of the SES measure used, the challenge is that students with low SES report significantly lower-quality relationships with their teachers by the end of the year, on each of the five relational elements. Although both more- and less-affluent students declined in their relationship quality, lower SES students dropped even more. This finding is consistent with previous research that suggests relationships with teachers may be even more impactful for low-income students and students of color (Roorda et al., 2011; Wentzel, 2012). Greater intentional focus in teacher professional development, supervision, and evaluation on increasing the quality of student-teacher developmental relationships, especially for students with low SES backgrounds, may contribute to corresponding increases in students' academic motivation and achievement.

The current study found no evidence of a moderating role for SES. This result differs from most previous studies, which tend to find that teachers have lower expectations and provide fewer challenging learning opportunities for disadvantaged students and students of color (Delpit, 2012; Lynn et al., 2010; Skinner et al., 2012). This divergence in results may simply be due to our sampling frame. Although we used a more comprehensive measure of student-teacher relationships than is common, the study focused on only one middle school in a suburban metropolitan district. Lower-SES students did perceive their relationships with teachers worsening over the school year, more so than their more affluent peers did. So the trends we found certainly do not dispute the thesis that lower-income students had lower-quality relationships with their teachers. A larger sample of schools with a greater percentage of lower-income students than 33% in this study may well have produced more evidence of SES moderation.

From a practice perspective, strengthening student-teacher relationships might not reduce motivation and achievement *gaps* by working more *strongly* for lower-SES students. But even if developmental relationships have the same effect for both lower- and higher-income students, this still could result in progress reducing gaps because lower-SES students, with lower achievement on average, have more room for the improving relationships with teachers to have a positive effect on achievement and other educational outcomes of interest.

Third, there was added value in predicting educational outcomes when student–teacher relationships include, not just caring and challenge from teachers, but also teacher provision of support, sharing of power, and expanding of students' possibilities. Both the path and regression models linking developmental relationships to students' belonging and motivation (and therefore, indirectly, to GPA), were significant for Grades 6 and 7, but only with the full measure of developmental relationships and not the abbreviated measure using only express care and challenge growth to define relationships. We know that students felt teachers were expressing care, and challenging them to grow, because the means for those elements were quite similar to the means for the “value-added” elements of providing support, share power, and expand possibilities, with challenge growth actually the most often reported relational experience. In other words, the added benefit of experiencing those three elements did not occur because students failed to experience care and challenge from their teachers. They experienced those elements at an okay, albeit not great, level. But when they also experienced teachers supporting them, sharing power with them, and expanding their possibilities, they felt more motivated and connected to the school.

These results both confirm and extend previous research. Yeager and Walton (2011) conducted an extensive review of social-psychological motivation interventions, for example, showing how even interventions that ostensibly focus on only one small aspect of motivation can have strong effects because of how it is inter-connected with other “recursive processes already in effect in schools” (p. 276). Thus, targeting how teachers promote a growth mindset instead of a fixed one in their students, or how teachers can make students feel like they belong and are valued, both being aspects of student–teacher relationships and well as student self-beliefs, can have more effect than might be predicted, because the intervention works within ongoing processes of the broader evolving student–teacher relationship, students' continuous recalibrating of their self-perceptions about ability, and their ongoing acquisition of content knowledge.

These results about the value-add of a more comprehensive measure of student–teacher relationships also are similar to those found by Gehlbach et al. (2012). Those researchers looked at both positive and negative aspects of relationships, finding, as did we, that a full model of relationships explained more of outcomes from achievement to affect to classroom participation than did a reduced model of just one relationship dimension. But even in that Gehlbach et al. study, the items leaned heavily on issues of respect and caring, and did not include assessment of how much teachers challenge students (high expectations), share power with them, or expand students' sense of life possibilities. Our inclusion of those latter constructs thus contributes to the growing body of research suggesting that defining, measuring, and strengthening student–teacher relationships more holistically may have added benefit over focusing largely on single dimensions of the relationship.

In some respects, the tests done here unfairly treat these aspects of relationships as purely independent and additive, when in fact, as we have noted, they are both distinguishable and also intertwined with each other. Empirically, these relational elements are moderately to highly correlated, so although each has some independence from the others, each is also sharing meaningful construct space with the others. Experientially, too, we have found in qualitative focus groups with middle and high school students (see Scales et al., 2019) that these five aspects of relationships are most often experienced in combinations, with specific teacher actions *feeling* to students like both expressions of care *and* sharing power, or challenging growth *and* providing support. Rarely does it seem that students experience these relational actions in isolation from each other. Their experience, and our empirical results, support a strategy of schools holistically trying to enhance all five of these elements of developmental relationships, even while understanding that an accent or emphasis on “share power” or “expand possibilities” for a given student at a given moment may be more impactful than an accent or emphasis on “express care” or provide support” at that moment.

#### 4.1 | Implications for practice

One of the key conclusions that Yeager and Walton (2011) drew from their review of social-psychological motivation interventions is that they were powerful because they were “stealthy.” The students were not told they were

in an intervention or experiment, and the intervention messages were woven into typical school practices in assignments, homework, and class discussions. They just seemed like a normal part of the school day, and so did not prompt student resistance, or feel controlling to the students. In many respects, teachers can strengthen the five elements of developmental relationships in the current study in similarly stealthy ways. Small changes, repeated over time, may not be overtly perceptible to a student, but may bring about in that student a perception that things with this teacher have gotten better.

Some specific examples of teacher practices that students in another of our studies said motivated them to work hard include the following. These hoped-for aspects of relationships that students said promoted motivation stayed consistent over the 1 ½ years and three waves of student reports (Scales et al., 2019). These are all relatively minimal-effort practices, such as how often a teacher: Warmly uses a student's name or smiles when interacting with them, or is able to sometimes be humorous with them; asks a question about their interests outside of school; praises them for working hard and as being capable of doing more difficult work, and helps them learn from their mistakes; shows students they will not give up on them no matter how far behind they get; connects them with opportunities or other students or school staff or community adults who can help them pursue a personal interest; talks with them about college as if it is a given the student is capable of attending and doing well in college; or asks for students' input and opinions on classroom routines, assignments, and interesting questions of content. None of these by themselves are very profound, or difficult for teachers to do. But taken together and repeated, they could have profound effects on students' motivation, engagement, and achievement.

Interventions focusing on some of these practices, such as changing students' beliefs about their own abilities and expectancies for success, or helping students feel more belongingness in school, have shown that they can help improve motivation and performance, with one meta-analysis of more than 90 such studies concluding that the mean effect size was a practically significant 0.49 (Lazowski & Hulleman, 2016). Yet, most studies, including those cited in the current paper, examine just one or two of the five elements we have included in the developmental relationships framework, most often focusing on teacher caring, or social support, or challenge in the form of teachers' expectations for students' performance. Further, although researchers and practitioners have known for decades that relational factors such as teacher support have substantial impact on students' intrinsic motivation and expectancies for success (e.g., Eccles et al., 1993; Goodenow, 1993), a recent collection of papers noted that there is still "scant research on interventions that improve teacher-student *relationships*" (Lin-Siegler, Dweck, & Cohen, 2016, p. 297, emphasis added). Although explicit relationships interventions may be rare, among the interventions that do succeed there is at least implicit acknowledgment that "positive social interactions and relationships among teachers and peers in school [are] a foundation for students' adjustment to and achievement in school" (Wentzel & Wigfield, 2007, p. 261).

Our findings suggest that the effects on motivation and performance of teachers doing *all five* of these relational practices—expressing care, challenging students to grow, providing support, sharing power with students, and expanding students' possibilities—may be greater than the already materially important results seen in the literature that focuses on only one or two of those relational factors. Even if a specific intervention focuses on other aspects of motivation that do not seem directly tied to the quality student-teacher relationships, such as improving students' beliefs about capabilities or the malleability of intelligence, or strengthening their self-regulation and meta-cognition strategies, our results suggest that embedding those and other motivational focuses within intentional efforts to more broadly promote developmental relationships as defined here may well yield even greater impact.

This suggestion is given further credence by Yeager and Walton's (2011) conclusions about the power of "recursive" processes such as student-teacher relationships to activate large changes from small interventions. Wigfield et al. (2015) also noted how these effects can multiply over time: "High-quality relationships with teachers serve to bolster students' perceptions of their competence, autonomy, and relatedness, which, in turn, elicit further teacher support" (p. 684). There are at least 15 significant theoretical frameworks spawning interventions to promote academic motivation, across dozens of educational settings, grades, content domains, and combinations of

student demographics (Lazowski & Hulleman, 2016). Relationships are not explicit in all of them, but attending to how the quality of the student–teacher relationship affects any motivational intervention may be the key to promoting greater intervention impact, regardless of its specific motivational theory or focus.

## 4.2 | Limitations

The most important limitation of this study is that it was conducted in just a single middle school. Although the sample was reasonably large and diverse, caution should be exercised in generalizing some of the results to other schools. That student–teacher relationships are important sources of motivation is clearly a result found in many other studies, at various grade levels. But no other study to our knowledge has specifically looked at the value-add of teachers providing support, sharing power with students, and expanding their possibilities, over the value of expressing care and challenging students to grow, as this study did. So although it is theoretically sensible, and there was support for that value-added hypothesis, additional research is needed to have greater confidence in that result.

In addition, some studies have found that positive relationships with teachers have even greater benefit for students from low-SES backgrounds (e.g., Wentzel, 2012). Our study did not find evidence of the moderation of associations between relationships and outcomes by SES. Rather, students across the SES continuum had similar associations of student–teacher developmental relationships with outcomes, even though relational quality did decline more for lower-income students over the school year. Again, the finding of no moderation may have been peculiar to this particular school, and so further study is needed.

## 4.3 | Conclusion

Nevertheless, our results are consistent with previous research that has demonstrated that student–teacher relationships can influence students' engagement, motivation, and performance. The current study adds to the literature by suggesting that the path of that influence of relationships on some indicators of school success such as GPA may be more indirect than direct, through the effect relationships have on students' motivation to engage with school and exert academic effort. The study also suggests that these associations between relationships, academic motivation, and academic outcomes may be especially salient for students with low SES, whose relationships with teachers, in the absence of an intervention, were found to worsen more over the school year than did more affluent students' relationships.

Finally, and perhaps most uniquely, this study suggests that there is a value-add when teachers provide more than just the care and challenging aspects of student–teacher relationships. Trying to strengthen student–teacher relationships to also maximize the provision of support, sharing of power, and expanding of student possibilities may heighten educators' capacity to help students become more motivated and engaged above and beyond the effect, they can achieve by expressing care and challenging their students to grow. Additionally, providing encouragement and training for other school staff such as counselors, administrators, coaches, and others to create and sustain similarly comprehensive developmental relationships with students could strengthen the motivational influence of relationships throughout the school community. This could promote synergistic effects on educational outcomes well beyond the effects attainable by small numbers of teachers or other staff who are relationally skilled by virtue of their life experiences or their personalities. At a time when educational standards are being raised and educational attainment greatly influences lifetime earnings and opportunity (Balfanz, Bridgeland, Bruce, & Fox, 2012), students without the relationships, mindsets, and aspirations to fuel their effort in the face of challenges are increasingly unlikely to grow into thriving and contributing young adults. This study suggests that strengthening student–teacher developmental relationships may be one of the more concrete and feasible ways educators can respond to that challenge.

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## CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

## ORCID

Peter C. Scales  <http://orcid.org/0000-0003-3418-9852>

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