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Impact of Teachers' Sense of Support on Students' Outcomes: The Mediating Role of Teachers' Beliefs

By

Zilin Zhu

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Faculty Advisor: Katherine O'Doherty
Preceptor: Hannah Hamilton

Abstract

Teachers are entrusted with great hopes and expectations from schools and parents, especially concerning child academic outcomes. However, focusing solely on teachers' pedagogy doesn't fully capture the complete spectrum of educational processes that are beneficial for a student's academic achievement. This study considers teachers' motivational beliefs (i.e., self-efficacy and sense of responsibility), their relationships with student outcomes (i.e., subject-specific interest, self-efficacy, post-secondary aspirations), and their sense of support (i.e., teachers' expectations, professional learning community, and principal support) as supplemental drivers for student academic achievement. Some notable findings from the study reveal that (a) math teachers' self-efficacy correlates positively with students' interest in math; (b) math teachers' self-efficacy mediates the relationships between teachers' sense of support and students' subject-specific self-efficacy, and (c) teachers' motivational beliefs do not predict students' aspirations for higher education. These findings offer implications for understanding the various ways high school teachers are influenced by the school ecosystem, and how this may be related to students' academic development. Further results, implications, and future directions are discussed.

Keywords: Self-Efficacy, Sense of Responsibility, Sense of Support, Mathematics and Science, Post-Secondary Aspirations

Impact of Teachers' Sense of Support on Students' Outcomes: The Mediating Role of Teachers' Beliefs

Scholars have long recognized that the profound effects of instructional practices are fundamentally interrelated and shaped by teachers' theoretical beliefs, such as their views on effective teaching methods and the potential of their students, in the classroom (Mangano & Allen, 1986; Blanton & Moorman, 1987; Guerra & Wubbena, 2017). Consistent evidence validates the relationships between teachers' possession of knowledge and skills, accompanied by their beliefs, and students' educational outcomes, particularly in terms of academic attainment and performance (Weiner, 1995; Anderson et al., 1988). A seminal moment in this exploration dates back to Rosenthal and Jacobson's (1968) classic but controversial study on the 'Pygmalion effect' in the classroom. This landmark study illuminated the influence of teacher expectations (i.e., that a randomly selected group of students would 'bloom') on student success, sparking a cascade of research into the psychological dimensions of education. However, as the literature has evolved to encompass various facets of teachers' impact on students, a notable gap persists. Researchers have placed excessive emphasis on teachers as independent units, studying their impacts solely at the classroom level, thereby neglecting the fact that teachers are integral parts of the school ecosystem, and their behaviors and beliefs can be significantly influenced by broader institutional and contextual factors. Additionally, few studies have addressed whether teachers' beliefs extend their influence on students beyond short-term outcomes, such as academic grades, to shape long-term outcomes, such as academic intentions and motivation, fostering 'sustainable learning' that could lead to higher achievement. Here, we look into three fundamental teacher beliefs that influence students' academic motivation: self-efficacy, sense of

responsibility, and sense of support. These three interrelated beliefs underlie effective teaching practices (and correspondingly student outcomes) and will be explored in greater depth.

Teachers' Self-Efficacy and Student Outcomes

Teachers' self-efficacy is one particularly important belief in the classroom in terms of classroom management, organizing courses, teaching, motivating the students for learning and communicating with the students effectively (Erdem & Demirel, 2007). Tracing back to the theoretical construct of self-efficacy, studies on teachers' self-efficacy have predominantly been conceptualized within Bandura's framework, which refers to "beliefs in one's capabilities to organize and execute the courses of action required to manage prospective situations" (1995, p.2). In the teaching context, teachers' self-efficacy is defined as the extent to which a teacher is confident about their capabilities to produce designated levels of performance that exercise influence over students' learning (Bandura, 1994 & 1995). Building upon this theoretical foundation, a critical inquiry arises: How does this self-efficacy belief manifest in the classroom, and what implications does it have on students and their educational experiences?

Buric and Kim (2020) examined the interplay between teacher self-efficacy (TSE), instructional quality, and student motivation. Their study revealed that students perceive teachers with higher self-efficacy as providing better instructional quality across dimensions such as classroom management, cognitive engagement, and support. Furthermore, classes with higher ratings of instructional quality reported elevated levels of students' own self-efficacy and intrinsic motivation, suggesting the mediating role of TSE in shaping student outcomes. Künsting et al. (2016) made a similar point that teachers with higher levels of self-efficacy and mastery-goal orientation are more likely to create supportive and positive classroom environments, implement effective classroom management strategies, and incorporate cognitive

engagement approaches into their instruction over time. Among all the unidirectional associations, Holzberger et al. (2013) present a fresh approach by examining the relationship between teacher beliefs and student outcomes. They conducted a longitudinal study to investigate students' experiences related to TSE, using data collected from German secondary mathematics teachers at two measurement points, which were one year apart. They demonstrated a reciprocal relationship between TSE and students' perceptions of instructional quality. When teachers exhibited higher self-efficacy, students reported greater cognitive challenge and activation during instruction, improved classroom structure, and increased individual learning support. Conversely, when students experienced greater cognitive activation and better classroom management, teachers reported increased confidence in their teaching abilities. Holzberger et al. (2013) approach the educational process with a bidirectional perspective, which promotes understanding of both teachers' and students' experiences.

In addition to the benefits students gain from teaching pedagogies facilitated by TSE, the enduring impact of TSE on students' achievement levels has been confirmed (Klassen & Tze, 2014). Some studies have taken further initiatives to explore the impact of TSE on students' achievement, particularly in certain subjects such as literacy and mathematics. One such study by Guo et al. (2012), utilized longitudinal data from the NICHD Study of Early Child Care and Youth Development (SECCYD) found that students under teachers with high self-efficacy demonstrated stronger literacy skills, as these educators may contribute to enhanced learning experiences. They also indicated that teachers with higher levels of self-efficacy, who positively influence student learning, tend to exert more effort to translate these convictions into reality. This underscores a critical revelation—while teachers' self-efficacy has often been overlooked as

a component of teacher quality in policy considerations, its profound impact on various aspects, including classroom practices and students' academic outcomes, is undeniable.

Apart from literacy skills, mathematics is another subject area that receives significant attention from researchers and educators. The study of mathematics is considered a cornerstone for later success in advanced education and serves as a gateway to a broad range of vocations in science, technology, engineering, and other disciplines (Sadler & Tai, 2007; Jordan et al., 2009). Perera and John (2020) explored the relationships between TSE for teaching math and student math achievement, both directly and indirectly through interaction quality, with large-scale data collected from Australian teachers and their students participating in the Grade 4 Trends in International Mathematics and Science Study (TIMSS) 2015 Assessment. The results showed that TSE for teaching math were positively associated with the class-average of math achievement and students' perceptions of interaction quality separately. Additionally, Perera and John (2020) found that individual perceptions of interaction quality were positively associated with the student's own math self-concept, and individual levels of math self-concept were positively associated with math achievement. The findings are robust and indicate the importance of TSE at both the class level, as well as the interplay among specific individual relational (e.g., students' perceptions of interaction quality) and motivational (e.g., academic self-concept) factors with respect to academic achievement. Considering all of this evidence, it appears that the impact of TSE on students' intrinsic motivation in those subjects is an area that has not yet been extensively studied, despite its potential significance for students' persistence in learning activities.

Teachers' Sense of Responsibility and Student Outcomes

Although self-efficacy beliefs and sense of responsibility may seem conceptually similar, Lauermann and Karabenick (2013) argued that having the belief in one's capability to accomplish a task does not inherently suggest a personal commitment to actually undertake it or an obligation to have completed it. Teachers' individual sense of the responsibility are defined by Lauermann and Karabenick (2011) as: "A sense of internal obligation and commitment to produce or prevent designated outcomes, or that these outcomes should have been produced or prevented" (p.127). For instance, teachers may assume responsibilities for supporting struggling students, delivering high-quality lectures, and engaging in other professional activities such as continuous learning through reading journals and educational books (Broadfoot et al., 1988).

A considerable amount of literature has been published on the impact of teachers' sense of responsibility and students' outcomes (e.g., academic achievement, learning motivation, learning habits). One of the studies done exploring how teachers' sense of responsibility influence adolescent students' outcomes within vocational education context found that when teachers are willing to assume responsibility for their instruction and student outcomes, they appear to be more attentive to students' educational needs and therefore supporting their students to be self-directed (Lauermann and Berger, 2021). Along with the pedagogical or teaching strategies, Berger and Girardet (2020) also reported the impact of in-service vocational teachers' sense of responsibility and their classroom management approach. They found that vocational teachers who report a strong sense of responsibility for teaching quality are more likely to adopt adaptive classroom management approaches, such as autonomy support and structure, as opposed to maladaptive styles like control and chaos, which will lead to the same promising student outcomes as well. Interestingly, the stronger a teacher's motivation to contribute to

society (social utility value), the greater the sense of responsibility they feel for student achievement, motivation, and interpersonal relationships (Berger and Girardet, 2020).

Prior research has also established that the impact of teachers' sense of responsibility on students' outcomes extends across academic education. Matteucci et al. (2017) conducted a study using samples from urban public high schools in Italy, suggesting that high school teachers who felt responsible for their teaching were more likely to advocate for mastery-oriented instructional practices that prioritize student effort and individual growth. All the aforementioned studies examined "felt responsibility," indicating teachers' willingness to adopt responsibility for student outcomes and their own teaching, as opposed to "assigned responsibility" (Eren, 2016). If teachers feel externally imposed responsibility, such as pressure to enhance student achievement and report on student progress, attendance, or behavior to administrators or parents, their sense of autonomy and self-regulation may be greatly constrained, potentially resulting in negative impacts on both teachers and students (Lauermann & Karabenick, 2014).

Nevertheless, individual-level responsibility assigned to teachers could be mitigated by fostering collaborative efforts among teachers toward common goals, thus nurturing collective responsibility (Lee & Smith, 1996). Lee & Smith (1996) asserted that collective responsibility for student development is considered an organizational attribute of a school. They noted a robust correlation between schools characterized with high levels of collective responsibility, where all faculty members share attitudes or commitments, and enhanced student learning across all subjects. Wu (2013) supported this notion with findings that collective responsibility is a significant factor that positively influences academic optimism (Hoy et al., 2006)—a construct composed of academic emphasis, collective efficacy, and faculty trust—in explaining school performance, and consequently, affects students' academic achievement (e.g., math). Together,

these studies suggest that both personal responsibility and collective responsibility contribute to improving student achievement or fostering students as autonomous and self-directed learners. However, long-term educational outcomes, such as intentions to attend post-secondary education, are often missing in most studies.

Domain-Specific Teachers' Beliefs

A great number of studies have delved into the relationships between teachers' beliefs and students' outcomes, particularly within the realm of science, technology, engineering, and mathematics (STEM) education. According to a report from the U.S. Department of Education (2007), 75% of the fastest-growing occupations require significant science or mathematics training. Thus, many educational institutions prioritize STEM, recognizing its long-term importance in preparing students for future careers. In the near term, STEM education also equips students with the readiness and preparation for post-secondary education and school curricula (Marginson et al., 2013; Lane et al., 2017). The promotion of STEM education and the development of STEM-focused institutions or intervention programs reflect their intrinsic value not only to students' personal growth but also their potential contribution to the economy and society (Tytler, 2020). Thus, it is of particular importance to investigate how STEM teacher beliefs influence student outcomes and whether those beliefs vary systematically from other academic domains as well as within STEM domains (e.g., Mathematics vs. Science).

Patterson et al. (2016) have presented evidence supporting the notion that teachers' beliefs regarding students' abilities in specific subjects carry significant influence. For instance, there is a notable prevalence of fixed beliefs or perceptions of innate giftedness among teachers regarding students' intelligence and aptitude in subjects like mathematics and science. They also reported that the most innate-ability-based view of performance is found in the arts domain (e.g.,

music, creative writing), and the most effort-based views of performance are observed in the humanities domain (e.g., language arts, social studies). In addition to teachers' distinct beliefs related to different types of subjects, Bursal (2009) offers further insights into how preservice elementary math and science teachers' teaching efficacy differs in Turkey. Although the preservice teachers included in this study, who graduated from their teacher education program, are equipped with adequate self-efficacy beliefs to teach elementary mathematics and science, the results reveal that prospective Turkish elementary teachers exhibit significantly lower self-efficacy in teaching science than in teaching mathematics, contrary to expectations. Additionally, female preservice elementary teachers participating in this study were found to have slightly higher self-efficacy in teaching math and science than their male counterparts, which contradicts some prior research where females typically reported lower mathematics and science teaching self-efficacy than males in countries other than Turkey (Brownlow et al., 2000; Ho et al., 2000; Zettle & Raines, 2000). Given the narrow focus of many studies on mathematics or science teachers in elementary or secondary education, and considering the significant impact of teachers' beliefs on teaching practices and student outcomes, it's crucial to understand how high school teachers' domain-specific beliefs vary. Exploring these variations is essential to comprehend the impact they have on students, as well as the challenges faced by teachers, particularly in the context where high school educators specialize in one subject rather than teaching multiple subjects as in elementary school.

Teacher Sense of Support and Teachers' Beliefs

Teachers' self-efficacy and sense of responsibility play a crucial role in shaping their impact on student success, influencing various aspects of education such as instructional practices, classroom management, and student engagement. Researchers have been exploring the

factors that influence teachers' beliefs, particularly their sense of support and empowerment within the workplace. Previous studies suggest that teachers who work in environments that neither challenge their teaching practices nor support innovative approaches are less likely to experience professional growth, even in the face of student challenges or personal frustration (McLaughlin, 1992). However, all the challenges teachers face in their careers can lead to detrimental outcomes such as burnout or attrition from the profession without taking into account their sense of support within the workplace,

Caprara et al. (2003) indicated that teachers' self-efficacy is influenced by the behavior of various school stakeholders, including principals, colleagues, staff, students, and families, who contribute to the school's functioning. They found that educators' perceptions of these stakeholders' behaviors can foster collective efficacy and mediate the relationship between individual teacher self-efficacy and perceived collective efficacy. Similarly, Aldridge and Fraser (2015) found that the approachability and supportiveness of school principals directly and indirectly contribute to teachers' self-efficacy. They also noted the significance of teachers' interactions with colleagues, highlighting that seeking help, advice, and feeling a sense of acceptance had a notable impact on teachers' self-efficacy. However, Pas et al. (2012) reported contradictory findings in their longitudinal study, where they found that while collegial leadership (e.g., The principal treats all faculty as his or her equal) may impact teachers' initial levels of efficacy, it does not affect how self-efficacy develops over time. Additionally, teacher affiliation (e.g., There is a feeling of trust and confidence among the staff) did not significantly relate to teachers' self-efficacy.

Matteucci et al. (2017) concentrated on teachers' sense of responsibility as another dimension of teachers' beliefs and examined the impact of contextual factors (i.e., teacher

perception of overall social climate). Indeed, they found teachers' perceived collaborative and positive relationships with students can positively predict teachers' perceived sense of responsibility for students' educational outcomes. What's more, Martin et al. (2001) investigated six dimensions of teacher empowerment (i.e., teacher status, autonomy, teacher impact, opportunities for professional development, teacher self-efficacy and teacher involvement in decision-making) and reported that teachers' perceived level of empowerment in the workplace predict the degree of responsibility teachers accept for the success of their students, but not their students' failures. The studies presented so far suggest that the relationships between teachers' sense of support and their beliefs are complex and sometimes contradictory, especially concerning colleagues and principals or other leadership roles. Therefore, delving deeper into how peers within the same department and those in positions of authority interact with teachers' beliefs is necessary.

The Current Study

Given the existing literature on the relationship between teachers' beliefs and students' educational achievements, our study seeks to explore how Math and Science teachers' perceptions of support within their work environments may impact their self-efficacy and sense of responsibility. We also aim to understand how these factors influence students' academic motivation and outcomes in both the short and long term. Investigating these questions is essential for gaining a comprehensive understanding not only of students' responses to their teachers but also of the complex effects on teachers themselves, particularly their motivational beliefs. This understanding can guide the development of educational policies and interventions at all levels, with the goal of fostering a resilient and positive teacher workforce and improving student outcomes. The hypotheses we intend to test are as follows:

H1: Math teachers have significantly higher levels of self-efficacy and sense of responsibility compared to science teachers.

H2: Math and science teachers' self-efficacy and sense of responsibility are significantly positively related to students' interest in taking later math and science courses.

H3: Teachers' sense of support (i.e., teacher expectations, professional community, principal support) are significantly positively related to math and science teachers' self-efficacy and sense of responsibility.

H4: Math/Science teachers' self-efficacy mediates the association between their sense of support and students' math/science self-efficacy.

H5: Math and science teachers' self-efficacy and sense of responsibility are both positively related to students' aspirations towards post-secondary education.

Method

Participants

The sample for this study is derived from the National Center for Education Statistics' (NCES) High School Longitudinal Study of 2009 (HSLS:09), a nationally representative and longitudinal two-staged study that is publicly accessible (LoGerfo et al., 2011). One group of the participants in this study are 9th graders who were tracked through their secondary and postsecondary years. The initial sample comprised 23,503 students from over 944 public and private high schools across 50 states and the District of Columbia, United States, in Fall 2009. In addition to base-year (2009) data collection, the first and second follow-up of HSLS:09 took place in 2012 and 2015 (2 years beyond high school graduation). After removing data from participants with missing data, the final sample consisted of 2,993 students, including 1431 males and 1562 females. Students were identified across six different race/ethnicity groups:

White (*n* = 1864), Hispanic (*n* = 343), Black/African-American (*n* = 231), Asian (*n* = 274), Native Hawaiian/Pacific Islander (*n* = 10), American Indian/Alaska Native (*n* = 15), and Bi-racial/Multi-racial (*n* = 256). Sampled students' participation in this study was contingent upon parental or guardian consent, either explicit (i.e., requiring a signed permission form before students could be surveyed) or implicit (i.e., where the permission form was sent to the parent or guardian of the sampled students but was not returned). The measures utilized in this study encompassed scales designed specifically for students to evaluate their math/science self-efficacy and interest in the fall 2009 math/science course. Aspirations towards postsecondary education, serving as another student outcome variable, were elicited in the first follow-up questionnaire under *SECTION G: Life After High School*.

In addition to the online student surveys, data collected through surveys administered to mathematics and science teachers, via phone or web, will also be examined. Teacher data in HSLS:09 is valuable for providing contextual understanding of the learning environment and educational outcomes of sampled students. However, demographic information for teachers is absent from the current dataset, a factor that is not the primary focus of this study. Consent from teachers was also obtained. This study included distinctive scales assessing teachers' self-efficacy, sense of (collective) responsibility, and perceptions of the working environment (i.e., principal support, teacher expectations, and the professional learning community). Although the questions within these scales remained consistent for both science and mathematics teachers, they were tailored with subject-specific wording, such as substituting "teachers" with either "science teachers" or "math teachers." The scales utilized for both students and teachers were specifically developed for HSLS:09 (LoGerfo et al., 2011). Scales used to measure all the variables included in this study were mostly assessed on a 4-point scale (1 = *strongly disagree ;* 4

= *strongly agree*). The negatively worded questionnaire items in HSLS:09 were subjected to reverse coding to ensure consistency in the direction of all items on the construct, with higher scale values representing positive attributes. Finally, scores for each measure were standardized to have a mean of 0 and a standard deviation of 1.

Students Measures

Mathematics/Science self-efficacy. The efficacy of students in math ($\alpha = 0.90$) and science ($\alpha = 0.88$) is evaluated. The scale comprises students' confidence in doing an excellent job on fall 2009 math/science tests, confidence in doing excellent job on fall 2009 math/science assignments, certainty in understanding the most challenging material presented in the math/science textbook used in the fall 2009, and certainty in mastering the skills being taught in the fall 2009 math/science course.

Mathematics/Science course interest. As part of the first follow-up student questionnaire, this 6-item scale ($\alpha = 0.75$ for math; $\alpha = 0.73$ for science) was utilized to measure the interest of sample students in their base-year math course. An example item from the scale is "You are enjoying this [math/science] class very much."

Aspirations towards post-secondary education. Three relevant questions were asked: As things stand now, how far in school do you think you will get? (Response options ranging from 1 = *less than high school* to 10 = *complete Ph.D/M.D/Law/other prof degree*); How sure are you that you will go on to college to pursue a Bachelor's degree after you leave high school? (Response options ranging from 1 = *very sure about going* to 4 = *very sure about not going*); and Whatever your plans, do you think you have the ability to complete a Bachelor's degree? (Response options ranging from 1 = *definitely not* to 4 = *definitely*).

Teacher Measures

Teacher self-efficacy. This scale assesses teachers' self-efficacy across 8 items (e.g., "If you really try hard, you can get through to even the most difficult or unmotivated students"). The Cronbach's Alpha values for this subscale were $\alpha = 0.71$ for mathematics teachers and $\alpha = 0.68$ for science teachers.

Perceptions of collective responsibility. This scale comprising 7 items ($\alpha = 0.89$ for both subject teachers) is utilized to gauge teachers' perceptions of shared accountability within their school community, encompassing the actions, decisions, or outcomes of the collective group. Higher scores indicate a greater perceived collective responsibility. The scale assesses various aspects ranging from individual responsibilities (e.g., "Teachers at this school set high standards for themselves") to school-wide responsibilities (e.g., "Teachers at this school take responsibility for improving the school").

Perceptions of principal support. The scale consists of 7 items ($\alpha = 0.90$ for both subject teachers) and evaluates the degree to which teachers perceive support from their school principal. Teachers respond to statements such as "The principal deals effectively with pressures from outside the school that might interfere with my teaching."

Perceptions of teacher expectations. Teachers were prompted by this 8-item ($\alpha = 0.86$ for both subject teachers) scale to assess the degree to which they perceive the expectations placed on them in their schools. Items include statements like "High school math teachers at your school believe all students can do well."

Perceptions of professional learning community. This 12-item scale ($\alpha = 0.91$ for both subject teachers) is utilized to assess teachers' perceptions of the sense of community, collaboration, support, and professionalism within the departmental environment. Statements

such as "Math/Science teachers in this department share and discuss research on effective teaching methods" and "Math/Science teachers in this department provide support to new mathematics/science teachers" are included in the scale.

Data Analysis

All data were analyzed using R Statistical Software version 4.3.2 (R Core Team, 2023). To investigate whether there are differences in beliefs between math and science teachers, two two-sample *t*-tests were employed. Subsequently, to examine the correlation between teachers' beliefs and students' interest in subjects, two correlational analyses were conducted. Additionally, four regression models were developed to explore the potential impact of teachers' perceived support within their working environment on their confidence in teaching and awareness of responsibilities. Following this, to assess the mediating effect of teachers' beliefs on the relationship between teachers' sense of support and students' subject self-efficacy, six mediation models were created and analyzed. Lastly, students' intention to pursue higher education after high school graduation is a crucial outcome variable with long-term implications. In this regard, irrespective of the specific subjects taught by teachers, three regression models were utilized to evaluate how teachers' self-efficacy and sense of responsibility collectively influence students' aspirations toward post-secondary education.

Results

Teachers' Beliefs

To investigate the variations in teachers' beliefs between math and science, two separate two-sample t-tests were conducted, one for self-efficacy and one for sense of responsibility. There was no significant statistical difference between self-efficacy in mathematics teachers ($M = 0.18$, $SD = 0.88$) and science teachers ($M = 0.17$, $SD = 0.97$), $t(5,921) = 0.54$, $p = 0.59$, *95% CI*

= [-0.03, 0.06]. However, mathematics teachers, compared to science teachers, demonstrated a significantly higher sense of responsibility. Therefore, hypothesis 1 was partially supported.

Table 1

Means, Standard deviations, and Correlations with 95% Confidence Intervals for Math and Science Teachers

Variable	*M*	*SD*	1	2	3
1. Self-Efficacy	0.18 (0.17)	0.88 (0.97)	–		
2. Sense of Responsibility	0.23 (0.11)	0.99 (0.94)	.20** [.16, .23] (.21**) [.17, .24]	–	
3. Students' Interest in Fall 2009 course	0.13 (0.13)	1.00 (1.00)	.07** [.03, .11] (.02) [-.01, .06]	.03 [-.01, .06] (.03) [-.01, .07]	–

Note. Science teacher scores in parentheses. Values below the diagonal represent correlations for math teachers. Values above the diagonal represent correlations for science teachers. * indicates $p < .05$. ** indicates $p < .01$.

Building upon this, we further explore whether self-efficacy and sense of responsibility in math and science teachers correlate with students' interest in the math and science courses they took in the base year. As depicted in Table 1, the level of self-efficacy perceived by math teachers weakly but positively correlated with students' interest in the fall 2009 math course. However, the correlation between math teachers' sense of responsibility and students' interest in math courses they took in 2009 was not statistically significant. Additionally, there were no significant relationships between science teachers' beliefs (both self-efficacy and sense of responsibility) and students' interest in the science course they took in 2009. Therefore, hypothesis 2 was partially supported for math teachers' self-efficacy only.

Links Between Teachers' Sense of Support and Their Beliefs

Multiple regression analysis was performed to examine the association between teachers' perceptions of their working environment, focusing specifically on three dimensions (i.e., teacher expectations, professional community, and principal support), and the self-efficacy and sense of responsibility of both math and science teachers (see Table 2 & 3). The findings revealed significant positive associations between teachers' perceived support from their environment and their sense of responsibility. Particularly, sensing a stronger professional learning community among teachers, higher expectations from colleagues within the same department, and greater

Table 2

Regression Analysis Summary for Math Teachers' Sense of Support Predicting Their Beliefs

			95% CI				
Predictors	*Estimates*	*SE*	*LL*	*UL*	*t-value*	β	*p*
Self-efficacy							
Intercept	0.13	0.02	0.10 – 0.17		8.32		<0.001
Professional Learning Community	-0.00	0.02	-0.04 – 0.03		-0.22	-0.00	0.823
Teachers Expectations	0.20	0.02	0.16 – 0.24		10.45	0.21	<0.001
Principal Support	0.06	0.02	0.03 – 0.10		3.70	0.07	<0.001
2993 Observations; R^2/R^2 adjusted: 0.053/0.052							
Sense of Responsibility							
Intercept	0.10	0.01	0.08 – 0.13		7.01		<0.001
Professional Learning Community	0.18	0.02	0.15 – 0.21		10.47	0.17	<0.001
Teachers Expectations	0.41	0.02	0.37 – 0.44		22.99	0.37	<0.001
Principal Support	0.29	0.02	0.26 – 0.32		17.87	0.27	<0.001
2993 Observations; R^2/R^2 adjusted: 0.369/0.369							

Table 3

Regression Analysis Summary for Science Teachers' Sense of Support Predicting Their Beliefs

Predictors	*Estimates*	*SE*	95% CI *LL*	95% CI *UL*	*t-value*	β	*p*
Self-efficacy							
Intercept	0.14	0.02	0.10 – 0.17		7.90		<0.001
Professional Learning Community	0.01	0.02	-0.03 – 0.05		0.63	0.01	0.529
Teachers Expectations	0.16	0.02	0.12 – 0.20		7.86	0.16	<0.001
Principal Support	0.10	0.02	0.06 – 0.14		4.75	0.09	<0.001
2993 Observations; R^2/R^2 adjusted: 0.048/0.047							
Sense of Responsibility							
Intercept	0.03	0.01	0.00 – 0.06		2.20		0.028
Professional Learning Community	0.16	0.02	0.12 – 0.19		9.21	0.16	<0.001
Teachers Expectations	0.36	0.02	0.33 – 0.39		21.71	0.37	<0.001
Principal Support	0.22	0.02	0.19 – 0.25		12.91	0.21	<0.001
2993 Observations; R^2/R^2 adjusted: 0.344/0.343							

support from principals were linked to increased levels of responsibility among both math and science teachers. Furthermore, higher expectations and increased support from principals were predictive of heightened levels of self-efficacy among both math and science teaching groups. Of particular interest is the lack of impact observed from the professional learning community within the science and mathematics departments on teachers' self-efficacy. Neither of these associations between the professional learning community and the self-efficacy of math or science teachers reached statistical significance.

The Mediating Role of Math and Science Teachers' Self-Efficacy

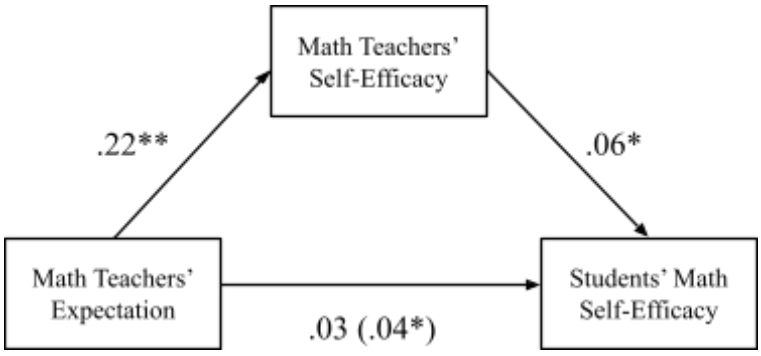
Mediation analysis was performed through PROCESS model 4 (Hayes, 2022) to assess whether math/science teachers' self-efficacy beliefs mediate the association between teachers' sense of support (teacher expectations, professional learning community, principal support) in schools and students' confidence in their ability to succeed in math and science classes. A series of regression analyses were carried out and coefficients for each path, the direct, indirect, and total effects were calculated.

Teachers' Perceived Expectations & Students' Subject Self-Efficacy

The results (see Figure 1; Table 4) indicate that although the direct effect of math teachers' perceived expectations on students' math self-efficacy was nonsignificant, there was a significant indirect effect. Consequently, the total effect of math teachers' perceived expectations on students' math self-efficacy was significant. This suggests that the relationship between math teachers' perceptions of expectation in their schools and students' math self-efficacy can be fully explained by math teachers' self-efficacy. In contrast, there was no evidence of a mediated relationship between science teachers' perceived expectations and students' science self-efficacy through the influence of science teachers' self-efficacy (see Figure 2; Table 5).

Figure 1

Standardized Path Coefficients



Note: Coefficients in parentheses refer to the direct path without the mediator in the model.
***$p < .001$, **$p < .01$, *$p < .05$

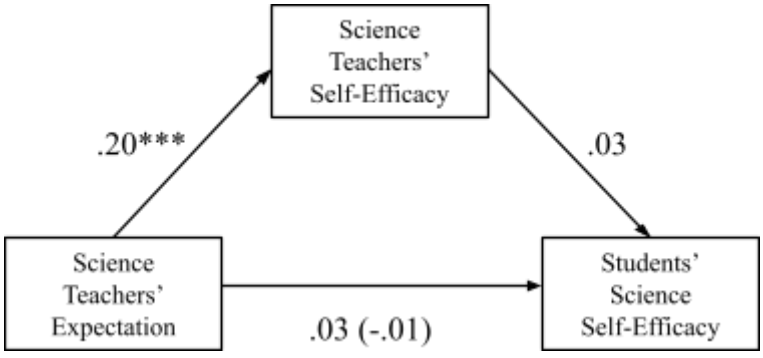
Table 4

Mediation Analysis Results (X = Math Teachers' Expectation, M = Math Teachers' Self-Efficacy, Y = Students' Math Self-Efficacy)

			95% CI				
Variables	*b*	*SE*	*LL*	*UL*	β	*t*	*p*
DV: Math Teachers' Self-Efficacy							
Math Teachers' Expectation	0.21	0.02	0.18 – 0.25		0.22	12.35	<0.001
		R^2 = 0.05, $F(2,991) = 152.41$, $p < 0.001$					
DV: Students' Math Self-Efficacy							
Math Teachers' Expectation	0.03	0.02	-0.01 – 0.07		0.03	1.38	0.17
Math Teachers' Self-Efficacy	0.07	0.02	0.03 – 0.11		0.06	3.41	<0.001
		R^2 = 0.01, $F(2,990) = 8.22$, $p < 0.001$					
Total Effect	0.04	0.02	0.00 – 0.08		0.04	2.18	<0.05
Direct Effect	0.03	0.02	-0.01 – 0.07		0.03	1.38	0.17
Indirect Effect	0.02	0.05	0.01 – 0.03		0.01		

Figure 2

Standardized Path Coefficients



Note: Coefficients in parentheses refer to the direct path without the mediator in the model.
***$p < .001$, **$p < .01$, *$p < .05$

Table 5

Mediation Analysis Results (X = Science Teachers' Expectation, M = Science Teachers' Self-Efficacy, Y = Students' Science Self-Efficacy)

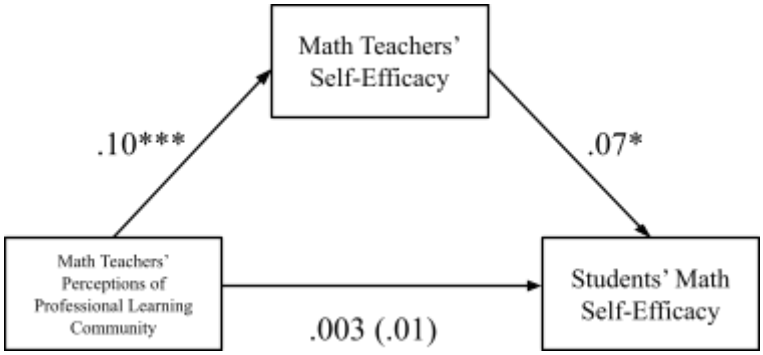
			95% CI				
Variables	*b*	*SE*	*LL*	*UL*	β	*t*	*p*
DV: Science Teachers' Self-Efficacy							
Teachers' Expectation	0.20	0.02	0.16 – 0.23		0.20	11.10	<0.001
		R^2 = 0.04, $F(2991) = 123.17$, $p < 0.001$					
DV: Students' Science Self-Efficacy							
Teachers' Expectation	-0.02	0.02	-0.06 – 0.02		-0.02	-1.11	0.27
Science Teachers' Self-Efficacy	0.03	0.02	-0.01 – 0.07		0.03	1.60	0.11
		R^2 = 0.001, $F(2,990) = 1.60$, $p = 0.20$					
Total Effect	-0.02	0.02	-0.05 – 0.02		-0.01	-0.81	0.42
Direct Effect	-0.02	0.02	-0.06 – 0.02		-0.02	-1.11	0.27
Indirect Effect	0.01	0.004	0.00 – 0.01		0.01		

Teachers' Perceived Professional Learning Community & Students' Subject Self-Efficacy

In terms of teachers' perceptions about the professional learning community within their department at their school, results suggest that the indirect effect of the professional learning community perceived by math teachers on students' math self-efficacy was statistically significant; however, the direct effect and the total effect were not. Although the indirect effect is significant, it appears to be suppressed in the full model (see Figure 3; Table 6). As shown in Figure 4 and Table 7, the indirect, direct, and total effects of the professional learning community perceived by science teachers on students' science self-efficacy through science teachers' self-efficacy were all non-significant.

Figure 3

Standardized Path Coefficients



Note: Coefficients in parentheses refer to the direct path without the mediator in the model.
***$p < .001$, **$p < .01$, *$p < .05$

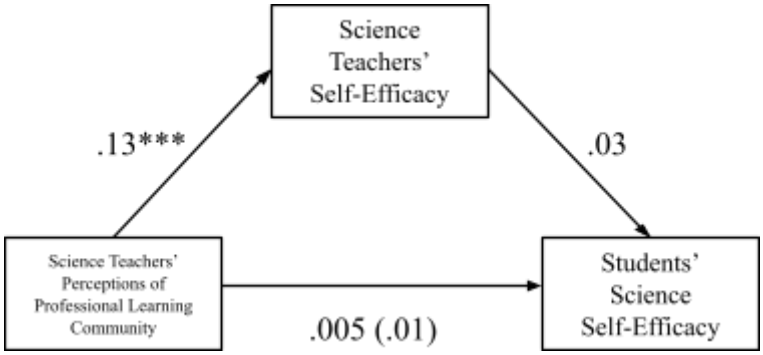
Table 6

Mediation Analysis Results (X = Math Teachers' Perceptions of Professional Learning Community, M = Math Teachers' Self-Efficacy, Y = Students' Math Self-Efficacy)

			95% CI				
Variables	*b*	*SE*	*LL*	*UL*	β	*t*	*p*
DV: Math Teachers' Self-Efficacy							
Professional Learning Community	0.09	0.02	0.06 – 0.13		0.10	5.67	<0.001
			$R^2 = 0.01$, $F(2991) = 32.14$, $p < 0.001$				
DV: Students' Math Self-Efficacy							
Professional Learning Community	0.004	0.02	-0.03 – 0.04		0.003	0.19	0.85
Math Teachers' Self-Efficacy	0.08	0.02	0.04 – 0.12		0.07	3.77	<0.05
			$R^2 = 0.005$, $F(2,990) = 7.28$, $p < 0.05$				
Total Effect	0.01	0.02	-0.03 – 0.05		0.01	0.58	0.56
Direct Effect	0.003	0.02	-0.03 – 0.04		0.003	0.19	0.85
Indirect Effect	0.01	0.003	0.00 – 0.01		0.01		

Figure 4

Standardized Path Coefficients



Note: Coefficients in parentheses refer to the direct path without the mediator in the model.
***$p < .001$, **$p < .01$, *$p < .05$

Table 7

Mediation Analysis Results (X = Science Teachers' Perceptions of Professional Learning Community, M = Science Teachers' Self-Efficacy, Y = Students' Science Self-Efficacy)

			95% CI				
Variables	*b*	*SE*	*LL*	*UL*	β	*t*	*p*
DV: Science Teachers' Self-Efficacy							
Professional Learning Community	0.01	0.02	0.09 – 0.16		0.13	6.98	<0.001
			$R^2 = 0.02$, $F(2991) = 48.71$, $p < 0.001$				
DV: Students' Science Self-Efficacy							
Professional Learning Community	0.004	0.02	-0.03 – 0.04		0.005	0.25	0.81
Science Teachers' Self-Efficacy	0.03	0.02	-0.01 – 0.06		0.03	1.36	0.17
			$R^2 = 0.001$, $F(2,990) = 1.01$, $p = 0.36$				
Total Effect	0.01	0.02	-0.03 – 0.04		0.01	0.42	0.67
Direct Effect	0.005	0.02	-0.03 – 0.04		0.005	0.25	0.81
Indirect Effect	0.003	0.002	-0.00 – 0.01		0.003		

Teachers' Perceived Principal Support & Students' Subject Self-Efficacy

There was a statistically significant indirect effect in combination with non-significant direct and total path from math teachers' perceptions of principal support to students' math self-efficacy. The finding suggests that math teachers' perceptions of principal support influence students' math self-efficacy through the math teachers' self-efficacy (see Figure 5; Table 9). Consistent with previous failed explanations for the mediating role of science teacher's self-efficacy, the results (see Figure 6; Table 10) of a mediation model assessing whether science teachers' self-efficacy mediated the impact of perceived support from the principal on students'

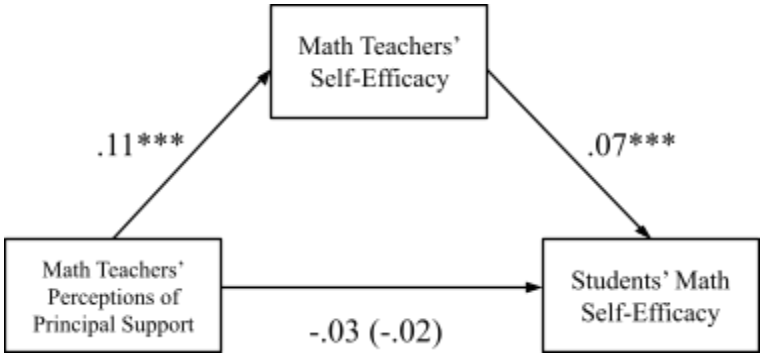
Table 9

Mediation Analysis Results (X = Math Teachers' Perceptions of Principal Support, M = Math Teachers' Self-Efficacy, Y = Students' Math Self-Efficacy)

			95% CI				
Variables	*b*	*SE*	*LL*	*UL*	β	*t*	*p*
DV: Math Teachers' Self-Efficacy							
Principal Support	0.17	0.02	0.07 – 0.14		0.11	6.30	<0.001
			$R^2 = 0.01$, $F(2991) = 39.63$, $p < 0.001$				
DV: Students' Math Self-Efficacy							
Principal Support	-0.03	0.02	-0.07 – 0.01		-0.03	-1.57	0.12
Math Teachers' Self-Efficacy	0.08	0.02	0.04 – 0.12		0.07	3.97	<0.001
			$R^2 = 0.006$, $F(2,990) = 8.50$, $p < 0.05$				
Total Effect	-0.02	0.02	-0.59 – 0.02		-0.02	-1.12	0.26
Direct Effect	-0.03	0.02	-0.07 – 0.01		-0.03	-1.57	0.12
Indirect Effect	0.01	0.003	0.00 – 0.01		0.01		

Figure 5

Standardized Path Coefficients



Note: Coefficients in parentheses refer to the direct path without the mediator in the model. ***$p < .001$, **$p < .01$, *$p < .05$

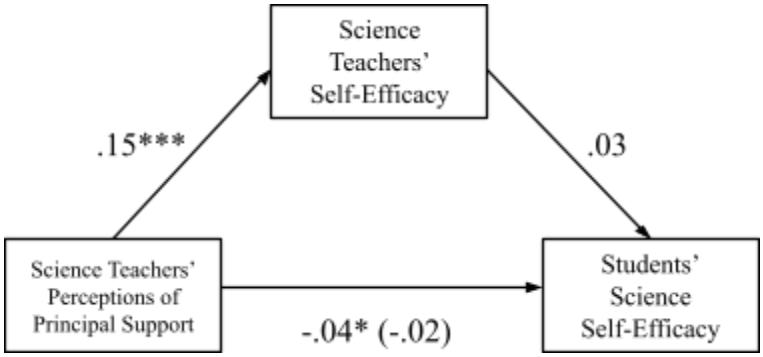
Table 10

Mediation Analysis Results (X = Science Teachers' Perceptions of Principal Support, M = Science Teachers' Self-Efficacy, Y = Students' Science Self-Efficacy)

			95% CI				
Variables	*b*	*SE*	*LL*	*UL*	β	*t*	*p*
DV: Math Teachers' Self-Efficacy							
Principal Support	0.16	0.02	0.12 – 0.20		0.15	8.46	<0.001
			$R^2 = 0.02$, $F(2991) = 71.59$, $p < 0.001$				
DV: Students' Science Self-Efficacy							
Principal Support	-0.05	0.02	-0.09 – -0.01		-0.04	-2.42	<0.05
Science Teachers' Self-Efficacy	0.03	0.02	-0.00 – 0.07		0.03	1.76	0.08
			$R^2 = 0.006$, $F(2,990) = 8.50$, $p < 0.05$				
Total Effect	-0.02	0.02	-0.59 – 0.02		-0.02	-1.12	0.26
Direct Effect	-0.03	0.02	-0.07 – 0.01		-0.03	-1.57	0.12
Indirect Effect	0.01	0.003	0.00 – 0.01		0.01		

Figure 6

Standardized Path Coefficients



Note: Coefficients in parentheses refer to the direct path without the mediator in the model. ***$p < .001$, **$p < .01$, *$p < .05$

science self-efficacy indicate there was no statistically significant indirect effect, but both the direct and total effects were significant.

Overall, the pattern of results from six mediation models suggests that the association between math teachers' sense of support and students' self-efficacy in math depends on the self-efficacy of math teachers, acting as a mediating factor. Furthermore, neither science teachers' perceptions of expectations nor professional learning communities appear to reliably predict students' self-efficacy in science. Although the initial hypothesis that greater perceived support from principals by science teachers would lead to greater student confidence in science through the mediation of science teachers' self-efficacy was not supported, the results yielded a surprising finding: in the absence of a mediator, science teachers' perceptions of principal support negatively predicted students' self-efficacy in science.

The Links between Teachers' Beliefs and Students' Post-Secondary Aspiration

In the present study, we examined the predictive relationships between teachers' self-efficacy and sense of responsibility, encompassing both math and science teachers, and students' intentions to pursue higher education. Specifically, we investigated 9th graders'

confidence in their educational trajectory, certainty about attending college and obtaining a degree, and confidence in their ability to complete a bachelor's degree, utilizing three linear regression models (see Table 11). Contrary to expectations, neither the self-efficacy beliefs nor the sense of accountability of math and science teachers significantly predicted how 9th graders perceive their academic trajectory. Likewise, the regression model testing whether math and science teachers' two beliefs could predict 9th-grade students' certainty about attending college to pursue a bachelor's degree in arts or science did not yield significant results. It was also revealed that neither teachers' self-efficacy nor sense of responsibility significantly influenced 9th graders' self-evaluations of their ability to complete a bachelor's degree. This suggests that teachers' beliefs were not linked to students' post-secondary aspirations.

Table 11

Regression Analysis Summary for Both Math & Science Teachers' Beliefs Predicting Students' Post-Secondary Aspiration

			95% CI				
Predictors	*Estimates*	*SE*	*LL*	*UL*	*t-value*	β	*p*
As things stand now, how far in school do you think you will get?							
Intercept	8.10	0.03	8.04 – 8.16		262.36		<0.001
Math Teacher's Self-Efficacy	0.05	0.03	-0.01 – 0.12		1.53	0.03	0.13
Math Teacher's Sense of Responsibility	0.01	0.03	-0.05 – 0.07		0.39	0.01	0.70
Science Teacher's Self-Efficacy	0.03	0.03	-0.03 – 0.09		1.07	0.02	0.29
Science Teacher's Sense of Responsibility	0.04	0.03	-0.03 – 0.10		1.18	0.02	0.24
2993 Observations; R^2/R^2 adjusted: 0.002/0.001							

How sure are you that you will go on to college to pursue a Bachelor's degree after you leave high school?						
Intercept	1.25	0.01	1.24 – 1.27	139.04		<0.001
Math Teacher's Self-Efficacy	0.00	0.01	-0.02 – 0.02	0.40	0.01	0.69
Math Teacher's Sense of Responsibility	-0.01	0.01	-0.03 – 0.09	-0.91	-0.02	0.36
Science Teacher's Self-Efficacy	-0.01	0.01	-0.02 – 0.01	-0.78	-0.01	0.44
Science Teacher's Sense of Responsibility	0.00	0.01	-0.01 – 0.02	0.52	0.01	0.60
2993 Observations; R^2/R^2 adjusted: 0.002/0.001						

Whatever your plans, do you think you have the ability to complete a Bachelor's degree?						
Intercept	3.68	0.01	3.66 – 3.70	396.09		<0.001
Math Teacher's Self-Efficacy	-0.00	0.01	-0.02 – 0.02	-0.04	-0.00	0.97
Math Teacher's Sense of Responsibility	0.01	0.01	-0.00 – 0.03	1.44	0.03	0.15
Science Teacher's Self-Efficacy	0.01	0.01	-0.01 – 0.02	0.68	0.01	0.49
Science Teacher's Sense of Responsibility	0.01	0.01	-0.00 – 0.03	1.33	0.03	0.18
2993 Observations; R^2/R^2 adjusted:0.002/0.001						

Discussion

In this study, we assessed how teachers' beliefs vary by domain as well as how they are affected by contextual environments and thus, can have an impact on students' outcomes.

Specifically, we investigated (1) whether math teacher's self-efficacy and sense of responsibility differ from science teachers; (2) how the beliefs of math and science teachers are related to students' interest in the fall 2009 math and science courses; (3) how teachers' perceptions of the working environment (i.e., teachers expectations, professional community, principal support) are related to their self-efficacy and sense of responsibility; (4) how teachers' self-efficacy mediate the association between three dimensions of teachers' perceptions of support and students' self-efficacy; and (5) how teachers' self-efficacy and sense of responsibility are related to students' aspirations towards post-secondary education. The present study builds upon prior research by investigating the connections between teachers' motivational beliefs and students' outcomes, while also considering the broader environment of teachers' workplaces and the extent to which they feel supported by it. In the following sections, we discuss our main findings and discuss implications for future research.

The results reveal intricate relationships among the variables. There was no statistically significant difference between math and science teachers' self-efficacy, yet math teachers scored significantly higher than math teachers on sense of responsibility. This self-efficacy finding diverges somewhat from Bursal's (2009) research, which revealed that preservice elementary teachers exhibited markedly lower self-efficacy in teaching science compared to mathematics. However, it's crucial to acknowledge that the present study focuses on high school teachers specializing in one subject, potentially influencing these differences from elementary teachers who typically teach multiple subjects. Additionally, it has been suggested that there was no significant difference in teachers' sense of responsibility, except for those teaching basic classes as opposed to advanced classes, who tended to assume more responsibility for students' success but less for their failure (Pratt, 1985), which does not align with our findings. This discrepancy

could be attributed to the different focus of the Responsibility for Student Achievement Questionnaire (Guskey, 1981) used in Pratt's study, which emphasized student achievement, whereas the HSLS:09 scale used in our study does not solely focus on academic achievement.

Higher levels of math teachers' self-efficacy predicted stronger interest in the fall 2009 math course among students, whereas science teachers' self-efficacy and the sense of responsibility of teachers in both subjects were unrelated to students' course decisions. This aligns with the findings of Upadyaya and Eccles (2014), who observed that higher teachers' beliefs about children's effort and potential performance predicted children's higher levels of interest in math across the primary school years. However, they found that the predictability of teachers' beliefs about children's innate math ability was only salient at the beginning of primary school. Despite quantitative and qualitative studies exploring students' intrinsic interest or motivation to continue learning mathematics and science, teachers' beliefs are often not included as predictors (Domino, 2009; Kiemer et al., 2015). Our findings demonstrate the importance of including teacher self efficacy beliefs as an important predictor of students' academic motivation. Regarding the lack of predictive power of teachers' sense of responsibility on students' interest in a subject in the current study, one potential explanation could be that the items in the Teacher Sense of Responsibility scale were not specifically tailored to student outcomes but instead addressed a broad spectrum of responsibilities related to school improvement, professionalism, assisting colleagues, and professional ethics specific to students.

Both mathematics and science teachers' perceptions of support are linked to their motivational beliefs, with the exception of a negative correlation between science teachers' perceptions of the professional learning community and their self-efficacy. This underscores the significant role played by both the expectations placed on teachers and the support provided by

principals and the school community in shaping their self-efficacy, a finding consistent with much of the previous literature (Hoy & Woolfolk, 1993; Hipp & Bredeson, 1995; Bandura, 1997). It highlights the importance of considering both external expectations and support systems in fostering teachers' confidence and effectiveness in their roles. By identifying areas where teachers may need additional support or resources, these adjustments can enhance educators' sense of efficacy, ultimately benefiting student outcomes.

Expanding upon previous research, which predominantly found positive relationships between teachers' self efficacy and students' subject-specific self-efficacy and achievement (Chang, 2015), the present study takes a broader perspective by considering the macro ecosystem of the school. It seeks to investigate whether teachers' sense of support, which reflects the support provided at individual, departmental, administrative, or leadership levels, influences students' subject-specific self-efficacy through teachers' beliefs. An important discovery from this study is that math teachers' self-efficacy beliefs fully mediate the relationship between math teachers' sense of support and their students' math self-efficacy. This implies that when math teachers feel supported in their roles, it positively impacts their confidence in teaching, subsequently boosting their students' confidence in their math abilities. This finding suggests that a supportive school climate, as perceived by math teachers, can potentially foster a growth mindset among students, encouraging them to believe in their math abilities. Therefore, not only can an improvement in students' mathematical achievement be expected (Dweck, 2016), but it is also particularly significant given that mathematics, as one of the STEM disciplines, plays a crucial role in preparing students for success in higher education (Marginson et al., 2013; Lane et al., 2017). However, this mediated relationship was not observed among science teachers, indicating potential differences in the dynamics between teacher support, teacher self-efficacy,

and student outcomes across different subject areas. Further exploration into these differences could provide valuable insights into how to effectively support both math and science teachers in promoting student self-efficacy and academic success.

One unexpected finding is that none of the teachers' beliefs, including self-efficacy and sense of responsibility, predict students' aspirations to pursue higher education. This is quite surprising, given the substantial body of research exploring teachers' and parental expectations regarding their students' post-secondary educational aspirations. Previous studies have consistently shown that increased expectations perceived by students from both teachers and parents are often associated with a higher likelihood of college enrollment and other educational successes (Kirk et al., 2012; Agger et al., 2018; Van den Broeck et al., 2020). While it's true that expectations play a role in shaping students' educational goals, this study adds nuance to the discussion by highlighting that teachers' motivational beliefs about themselves as educators, such as self-efficacy and sense of responsibility, do not predict students' intentions to pursue higher education like university. This result is challenging to explain, but it may be related to factors beyond teachers' influence, such as families' expectations (Agger et al., 2018b), parents' educational levels (Gil-Flores et al., 2011), peers' college plans (Chenoweth & Galliher, 2004), and other variables that were not included in this study.

Limitations and Future Directions

Although this study has offered novel insights into the relationship between teachers' beliefs and student outcomes, it is crucial to acknowledge several limitations that may have influenced the interpretation of the findings. This study is limited by NCES removing identifiable information, aiming to better protect participants in HSLS:09, particularly teachers and their affiliated schools. Consequently, it is unclear whether each teacher in the data appears

repeatedly. Therefore, teachers with larger class sizes or other factors in a specific classroom might disproportionately influence the results. Additionally, participants, including teachers and students, are not independent of one another. In the current study, we are unable to differentiate between teachers and students from the same school or even the same classroom, which presents challenges when drawing conclusions that have meaningful implications for specific schools. Future research should address these limitations by examining questions with a different sample of teachers and account for the fact that students are nested within teachers and teachers are nested within schools. These results must therefore be interpreted with caution. Despite the fact that the sample size originated from HSLS: 09 is large and available data collected on national scale is extensive, this study is limited by the pre-existing dataset that may not include relevant variables of interest. For instance, this dataset does not have scales measuring teachers' professional well-being (i.e., job satisfaction), which would be highly relevant in our examination of teacher belief influences on student outcomes.

There is room for further research investigating whether elementary teachers may indeed experience lower self-efficacy in certain domains (e.g., math or science) compared to their high school counterparts due to the demands of teaching multiple subjects. Additionally, investigating cross-cultural differences could yield valuable insights, as teacher support and beliefs are likely to vary across different educational systems. For example, in China, teachers specialize in teaching a single subject starting from elementary school. However, in high schools, particularly among those teaching mathematics, educators may encounter greater challenges or burdens compared to their counterparts in science. This is due to the fact that mathematics is one of the three core subjects, along with Chinese and English, with significant weighting in the national college entrance examination (*GaoKao*), commonly known as the "high-stakes test" (Muthanna

& Sang, 2015). Furthermore, future research should consider that teachers from different disciplines are likely to influence student outcomes differently. It may be feasible to conduct comparisons between teachers in the arts and those in the sciences, which is not covered by the current dataset.

Conclusion

Despite these limitations, the study does offer insights into the importance of considering how teachers' motivational beliefs (beyond traditional pedagogy) act as mediators, modifying the relationships between teachers' sense of support from the school environment and various student outcomes. While the study reveals the lack of predictive power of teachers' motivational beliefs on students' aspirations for higher education, it underscores the complex interplay between teachers, their perceptions of support from the school they work in, and shorter-term student outcomes such as course choices. By highlighting the potential for a virtuous cycle or reciprocal nature of the relationship between teachers and their environment within the school ecosystem, the conclusion suggests that positive interactions and support between teachers and their environment not only benefit students but also contribute to the professional development of teachers themselves. Recognizing the significance of teachers' motivational beliefs as the driving force behind their dedication to the profession empowers all stakeholders in the school context, from colleagues within the department to the principal, to be attentive to teachers' needs and provide timely or systematic support. This ensures that teachers do not bear sole responsibility for students' future success and are not solely to blame if students do not succeed.

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