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Student Readiness to Learn and Teacher Effectiveness: Two Key Factors in Middle Grades Mathematics Achievement

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Student Readiness to Learn and Teacher Effectiveness: Two Key Factors in Middle Grades Mathematics Achievement

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Abstract

This study examined student readiness to learn and teacher effectiveness in order to determine their impact on middle grades mathematics achievement. Survey data were collected from 964 middle grades students and 93 mathematics teachers in Texas. This study is the first to use this particular collective efficacy short form with middle grade students, and factor analyses were conducted accordingly. Hierarchical linear modeling was used to measure the relationship between teacher perceptions of student readiness to learn and student perceptions of teacher effectiveness on mathematics achievement in the middle grades. The results of these analyses indicated that students' perceptions of teacher effectiveness and teachers' perceptions of student readiness to learn each made a significant contribution to the variance in middle grades mathematics achievement. Implications are discussed.

Keywords: Faculty group competence, middle grades math achievement, student readiness to learn, teacher effectiveness

Introduction

Mathematics scores for middle grades students in the United States lag behind scores in most other developed nations (National Center for Education Statistics, 2015). The most recent Program for International Student Assessment (PISA) results demonstrate that while mathematics scores for middle grades students in the United States have remained relatively flat, scores are rising in other developed nations (Layton, 2013). Middle school is a particularly critical age for mathematics development. When students feel confident in their middle school mathematics abilities, they can successfully move to higher levels of mathematics

achievement. When they feel underprepared or unsuccessful, they are less likely to enroll in advanced mathematics courses (Pajares & Graham, 1999). Thus it is paramount that schools become aware of the factors that impact mathematics learning, particularly at the middle level.

To that end, this study examines student readiness to learn and teacher effectiveness in order to assess the relationship between these variables and mathematics achievement at the middle level. The researchers initiated this study at the request of campus and school district leaders who were interested in exploring specific climate factors with the goal of improving student learning in the area of mathematics. Specifically, school and district leaders wanted to explore student readiness to learn from the perspective of the teachers and teacher effectiveness from the perspective of the students. Teacher efficacy has been well explored from the perspective of the teacher (Goddard & Goddard, 2001). Less examined in the literature are student perceptions of teacher effectiveness or teacher perceptions of student readiness to learn. This study seeks to add to the growing and important international dialogue regarding this aspect of mathematics achievement.

Theoretical Background

Social Cognitive Theory

At the basis of the social cognitive theory is the belief that there is a reciprocal, cause-effect relationship among three determinants: the self (or intra-person), behavior, and environment (Bandura, 1978). One cannot isolate each determinant; rather they are dependent on one another. These determinants are not symbiotic but, instead, they act as dyads that shift based on the individual experience (Bandura, 2012). These interrelated experiences shape one's sense of efficacy. Bandura (1989) found that "development of resilient self-efficacy requires some experience in mastering difficulties through perseverant effort. If people experience only easy successes, they come to expect quick results and their sense of efficacy is easily undermined by failure" (p. 1179). In other words, the interplay between one's person, behavior, and environment determine how one will develop mastery experiences, which shape self-efficacy. Application of Bandura's (1978) social cognitive theory in a school environment is evident in Edmonds' (1979) five school properties that predicted student achievement; primarily how high expectations for students and an orderly school environment give students an edge towards academic outcomes.

Student Achievement

Researchers have unearthed some important variables that link with student achievement. To begin with, having a rigorous curriculum and utilizing curriculum-based assessments to identify opportunities for re-teaching is fundamental to student learning (Gillum, 2014; Stevenson, 2015). Additionally, effective continuing professional development is "essential for practitioners to enhance their pedagogical content knowledge and skills and, in turn, to enhance student outcomes" (Main & Pendergast, 2015, p. 1). The perception students and teachers have about one another impacts student learning. Lumpkin (2007) found that students who perceive their teachers as caring tend to be more motivated and perform better than their peers who do not indicate an affinity for their teachers. Competence and care are particularly important in middle-level education. As Virtue (2007) noted, "Effective teachers are apt instructors who plan and implement lessons and evaluate student learning … [and] are also skilled at establishing and cultivating constructive human relationships" (Virtue, 2007, p. 243). Not surprisingly, teachers who have high opinions of their students tend to get higher results. These student outcomes could be due, in part, to the Pygmalion effect which occurs when achievement rises for students about whom teachers are told their students are in the highest ability group when they are, in fact, previously low performing (Rosenthal & Jacobsen, 2003).

Kearney, Webb, Goldhorn, and Peters (2013) found a correlation between mathematics scores and critical feedback in a study of 87 mathematics classrooms in Texas. Specifically, teachers who received appraisal scores from their principals indicating high levels of critical feedback to students had higher mathematics achievement scores for their classrooms than their peers. Naturally, teachers' professional competence has a demonstrable effect on student ability to learn (Baumert et al., 2010). School principals play an important role in this process when they embrace the responsibility of instructional leadership to ensure that faculty are life-long learners perpetually refining their craft (George, 2000). Instructional leaders, "participate fully in training, care deeply about the results, and follow up with supervision that integrates teacher training and classroom observations" (George, 2000, p. 44).

Efficacy also appears to play an important role in mathematics achievement. Students who espouse a high level of belief in their mathematics abilities tend to demonstrate high levels of mathematics achievement (Siegle & McCoach, 2007). Similarly, Goddard and Goddard (2001) conducted a study of 438 teachers in 47 schools in a large urban school district in the United States and found that schools in which teachers espouse high levels of faculty members' collective efficacy have been shown to produce high student achievement scores. To be sure, there are many other factors which have the potential to influence student achievement. One such factor is student readiness to learn.

Student Readiness to Learn

Schools do not exist in a vacuum; they operate in the midst of communities made up of individual homes. For students to come to school ready to learn, it is essential that they feel safe not only within the school but also in their own homes and their community. Safe contexts where parents organize the community and rally around students allow for greater student aspirations and successes (Gaitan, 2012). The way parents and guardians interact with their children significantly impacts achievement (Stewart, 2006). Pfiffner, Villodas, Kaiser, Rooney, and McBurnett (2013) conducted a study of 17 girls and 40 boys in second through fifth grades in order to determine how direct parent intervention and involvement improved attentiveness of students and increased performance on academic tasks. They report that structured support at home leads to greater student behavioral and academic outcomes. Proving the point of the importance of home support, Chambers and Palmer (2010) noted that students who have had stays in multiple foster homes struggle more in schools than their peers. Thus, a stable home life appears to be crucial for students to make adequate academic gains.

The connection students feel with a group can positively or negatively affect their academic outcomes (Lee, Borden, Serido, & Perkins, 2009). Turner and Braine (2015) conducted a study of 32 teachers to determine whether there is a connection between safety and student performance. They found both novice and experienced teachers reported that students who felt safe submitted higher quality work. Loukas and Pasch (2013) purported that school connectedness can diminish the effects of bullying. To that end, Lemberger, Selig, Bowers, and Rogers (2015) surveyed 193 middle grades students in the southwestern United States. They reported that gains in connectedness to classmates and a supportive classroom environment positively impacted student achievement. It is important to note that perceptions of school climate can vary based on survey participants. For example, in a study of 1,431 students and 74 teachers from fourth- and fifth-grade classrooms in Texas, Kearney and Peters (2013) found significant differences between teacher and student perceptions of competition and cohesion. Safe, happy students are more likely to be ready to engage in academic thought and, ultimately, produce quality work outcomes (Newton, 2014).

Student readiness to learn and teacher competence are linked. In a survey of 42,754 high school students, Yazzie-Mintz (2010) reported a majority of students stated that material presented in class was not interesting, which contributed to their disengagement in class. Further, 35 percent of the students surveyed stated their boredom stemmed from a lack of interaction with their teacher. Both the student's readiness to learn and the teacher's competence is essential to student learning.

In a longitudinal study of 3,649 middle grades students, Orthner, Jones-Sanpei, Akos, and Rose (2013) discovered that between sixth and eighth grades, the measures of psychosocial engagement declined in most students. One factor that countered the decline in psychosocial engagement was the presence of teachers who provided a meaningful context for the students. In those cases, student engagement did not decline but instead was maintained at higher levels. Lounsbury (2017) argued that engaging students in their learning perpetuates principles of democracy that are crucial for their education. Lounsbury also stated that building relationships with students is particularly important in the middle grades.

Other factors may impact student readiness to learn in the middle grades. Holas and Huston (2011) found that sixth-grade students in a middle school setting reported lower school involvement than did comparable sixth-grade peers who were at an elementary school, thus suggesting school and classroom climate may impact student readiness to learn. It is important to note that Holas and Huston (2011) also found evidence that highly efficacious teachers had a demonstrable impact on student involvement in sixth-grade activities.

Teacher Effectiveness

Leyser, Zeiger, and Romi (2011) defined teacher efficacy as the impact the teacher believes he or she has on the students and their success. An early study by the RAND Corporation (Armor et al., 1976) yielded two items on their questionnaire that would later evolve into the construct of teacher efficacy. Since then, seminal studies by Bandura (1977) and Tschannen-Moran, Woolfolk-Hoy, and Hoy (1998) have served to further the study of efficacy in general and, specifically, teacher efficacy.

Teachers who exhibit high efficaciousness tend to exhibit higher levels of enthusiasm in the classroom. Boz and Boz (2010) concluded that this enthusiasm translates to a teacher who works harder to assist struggling students. Conversely, those who exhibit low levels of teaching efficacy tend to be more teacher-centered and have a weak commitment to the profession (Boz & Boz, 2010). They further suggested that teachers need to be specifically taught to satisfy the academic, social, and emotional needs of their students. School administrators have the responsibility to observe classroom instruction regularly and to provide substantive feedback and support to their faculty (Goldhorn, Kearney, & Webb, 2013). Feedback becomes particularly important in the middle grades, when students often struggle in the affective domain (Ross & Willson, 2012).

Archamault, Janosz, and Chouinard (2012) examined the correlation between a teacher's sense of efficacy and student achievement in 1,364 secondary students in disadvantaged communities in Quebec, Canada. They found that the teachers' sense of efficacy directly influenced the experiences of their students. In particular, the researchers noted increased achievement in mathematics. Thus, teachers' self-reported beliefs in their teaching abilities influenced student cognitive engagement and academic achievement.

A strong predictor of teacher efficacy is the number of professional development opportunities teachers receive related to student behavior management skills (Tsouloupas, Carson, & Matthews, 2014). In their study of 21 preservice teachers at a large, urban university in the southeast, Swars and Dooley (2010) found that professional development models, particularly the professional development school (PDS) model, impact teacher efficacy. Similarly, Dorel, Kearney, and Garza (2016) found that exposing aspiring teachers to field residency experiences early in their training provides additional opportunities for observation and feedback by university supervisors and resulted in higher levels of teacher self-efficacy. Teachers who are better prepared to handle student behavior can spend more time on effective instruction and engagement techniques (Ratcliff, Jones, Costner, Savage-Davis, & Hunt, 2010).

Asking middle grades students to assess teacher effectiveness is relatively new. One might ask whether middle school students have the objectivity to provide accurate ratings. Stevens, Harris, Liu, and Aguirre-Munoz (2013) raised this exact question in their study, in which they not only found that middle grades students meaningfully reported on their teachers' effectiveness, but these perceptions, in turn, were highly correlated with the students' levels of mathematics efficacy. Doda (2011) reminded us of the importance of involving students by telling less and asking more.

> Early progressives like John Dewey and A. S. Neill. . .believed in honoring the child's voice in the learning process. . . Empowering students more fully, however, does not mean abandoning clear and purposeful plans. Nor does attending to students' questions, concerns, and interests mean we ignore the core standards they are expected to master. (p.14)

Structuring student empowerment appropriately and providing reciprocity between teacher and student interactions may lead to greater student outcomes (Reeve, 2013). This study seeks to add to the small but growing body of literature exploring the relationship between teachers' and students' perceptions of one another and how these perceptions may impact student learning.

Methods

Research Questions

The study had two research questions.

1. What is the relationship between middle grades teacher perceptions of student readiness to learn and mathematics achievement?
2. What is the relationship between middle grades student perception of teacher effectiveness and middle school mathematics achievement?

Instrumentation

Teacher Survey. The Collective Efficacy Scale-Short Form developed by Goddard (2002) was selected for use in this study. This instrument has proven to be both valid and reliable in gauging teacher perceptions of faculty members' collective efficacy (Goddard,

2002). The Collective Efficacy Short Form is a 12-item instrument composed of two factors. Responses are measured on a six-point Likert scale with responses ranging from 1 (strongly disagree) to 6 (strongly agree). The first factor measured by this instrument is faculty group competence. There are six survey items total that measure group competence, half of which are reverse scored. Sample statements include: "Teachers in the school can get through to the most difficult students," and "Teachers here are confident they will be able to motivate their students."

The second factor this instrument measures is task analysis. This variable measures student readiness to learn. There are six survey items total that measure student readiness to learn, half of which are reverse scored. Sample statements from this factor include: "These students come to school ready to learn," and "Students here just aren't motivated to learn" (reverse scored).

Student Survey. This study is the first to utilize Goddard's (2002) collective efficacy instrument with middle grades students. It is therefore essential to establish the reliability of this survey to gauge whether it is appropriate to use this survey with this new population. Statistical analysis of the factor structure and reliability analysis for this instrument when used with middle grades students are included in the results for the reader's consideration. While the full results of the factor analysis are presented in the results section of this paper, an overview is included here for the reader's consideration.

Factor analysis yielded one reliable factor. All six items that loaded into this variable were derived from the faculty group competence section of the original survey. Items from the task analysis section of the survey did not demonstrate a sufficient Cronbach's alpha level to merit inclusion and accordingly were removed from the student version of this survey. The results yielded a single factor six-item instrument measuring student perception of teacher effectiveness. Items from this factor were:

- Teachers in the school can get through to the most difficult students.
- Teachers here are confident they will be able to motivate their students.
- If a child does not want to learn teachers here give up (reverse scored).
- Teachers here don't have the skills needed to produce meaningful student learning (reverse scored).
- Teachers in this school believe that every child can learn.
- Teachers in this school do not have the skills to deal with student disciplinary problems (reverse scored).

After conducting the factor analysis, a hierarchical linear regression model (HLM) was created to measure the relationship each of the variables within the surveys had with middle school mathematics achievement. There were three independent variables included in this HLM regression model: teacher perception of faculty group competence, teacher perception of student readiness for academic task analysis, and student perception of faculty group competence. The outcome or dependent variable selected for this study was mathematics achievement. Mathematics achievement was measured in this study as the percent of questions answered correctly by individual students on their state mathematics assessment.

Procedures

Classroom climate data were collected from 93 middle school mathematics classrooms in south-central Texas. A total of 93 teachers and 1,075 middle school students completed the Collective Efficacy Short Form (Goddard, 2002). Subsequently, student-level mathematics achievement data were entered into the database for analysis. Next, we excluded all data for students who did not have both completed survey forms and mathematics achievement results, which resulted in a total of 964 students that contributed data selected for statistical analysis.

Selection of participants was non-random and can best be described as a convenience sample (Creswell, 2014). Convenience sampling is well suited for educational research because participants are included based on their availability and willingness to participate in the research. Demographic information about these middle level campuses was identified through Texas' Public Education Information Management System (PEIMS), which yielded the following information. Among participating schools, 78% of students qualified for free or reduced lunch, 90% of students were Hispanic, 8% of students were Anglo, and 1% of students were African American. Among the faculty, 52% of faculty were Hispanic,

41% of faculty were Anglo, and 5% of faculty were African American. At the time of this study, 44% of faculty had 0–5 years of teaching experience, 26% of faculty had 6–10 years of teaching experience, 22% of faculty had 11–20 years of teaching experience, and 8% of faculty had greater than 20 years of teaching experience (Texas Education Agency, 2015).

School district personnel approved the dissemination of surveys, and the surveys were administered to faculty members and students. Principals were contacted for permission and scheduling dates that were convenient for them. Surveys were administered to faculty during a regularly scheduled mathematics department meeting. A trained researcher controlled the location, time, and conditions in which the surveys were administered and included meetings before school, after school, and during staff development days, depending on the preference of each principal. Surveys were administered to students during their regular instructional day. Students who returned parent permission forms and student assent forms were able to participate in the study. The researcher read a brief statement describing the scope of the study and ensuring anonymity and confidentiality. Participants were informed that if they were uncomfortable with any item, they were under no obligation to respond to it. The duration of the introduction, explanation, and completion of the survey instrument was approximately 15 minutes. Individuals who were absent were not afforded the opportunity to complete the survey at a later date.

Data Analysis

First, reliability and factor analyses were run to determine the feasibility of using the Collective Efficacy Short Form with middle grades students. Next, a level-1 model estimation was completed, which analyzed ratings of student perceptions. Finally, a two-level hierarchical linear model estimation was run with both student (level 1) and teacher (level 2) perceptions of faculty group competence. The results of these analyses are presented below.

Results

Factor and Reliability Analyses

The first stage in analyzing the data was to assess the reliability and the factor structure of the Collective Efficacy Short Form as specifically applied to the middle grades students in this study. Data were analyzed using confirmatory factor analysis. Two components emerged in a rotated varimax solution. The six items for group competence precisely loaded, as expected, with each of the six items demonstrating a strong correlation with group competence.

Additionally, reliability analysis revealed a robust Cronbach alpha level of reliability for group competence at (.741). Conversely, only three of the items in the second factor demonstrated strong correlations with one another. Reliability analyses were unacceptably low for task analysis (.149). These results support the use of the group competence factor but do not support the use of the task analysis factor when surveying middle grades students (see Table 1). Thus, when used with middle grades students, the factor analysis yielded a single factor instrument with six items measuring only the faculty group competence dimension of teacher effectiveness.

Descriptive Statistics

Following the factor and reliability analyses, descriptive statistics, including ranges, means, and standard deviations were computed for each of the variables. There was a wide range of test scores, with the percentage of correct responses on the state mathematics examination ranging from 4% to 98% correct. Student responses to both group competence and task analysis represented the full gamut of possible responses ranging from one to six on a six-point Likert scale. Teacher responses were slightly less spread, with teacher ratings for group competence ranging from 1.83 to 5.83 and ratings for task analysis ranging from 1.00 to 5.50 on a 6-point Likert scale (see Table 2).

Results of HLM Analyses

We used the one-way ANOVA with random effects model (also known as the null or unconditional model) to determine the existence and degree of unexplained variance in mathematics achievement between students. As expected, findings indicated that the majority of the variation in mathematics achievement exists at the student level ($\chi^2 = 78.93954$).

In the two-level HLM model, one student level factor and two teacher level factors were analyzed to assess the impact of each factor on middle grades mathematics achievement. Findings revealed a statistically significant relationship between student perception of faculty group competence and mathematics achievement ($\gamma_{10} = 2.77, t = 3.56, p < .01$). Findings also demonstrated that a statistically significant relationship exists between faculty perception of student readiness

Table 1
Factor Analysis for the Collective Efficacy Short Form When Used with Middle School Students

Item #	Survey Statement	Factor IGroup Compe-tence	Factor IITask Analysis
GC 1	Teachers in the school are able to get through to the most difficult students.	.707	
GC 2	Teachers here are confident they will be able to motivate their students.	.472	
GC 3	If a child doesn't want to learn teachers here give up (reverse scored).	.624	
GC 4	Teachers here don't have the skills needed to produce meaningful student learning (reverse scored).	.595	
GC 5	Teachers in this school believe that every child can learn.	.642	
GC 6	Teachers in this school do not have the skills to deal with student disciplinary problems (reverse scored).	.434	
TA 1	These students come to school ready to learn.		.123
TA 2	Home life provides so many advantages that students here are bound to learn.		.174
TA 3	Students here just aren't motivated to learn (reverse scored)		.339
TA 4	The opportunities in this community help ensure that these students will learn.		.559
TA 5	Learning is more difficult at this school because students are worried about their safety (reverse scored).		.540
TA 6	Drug and alcohol abuse in the community make learning difficult for students here (reverse scored).		.513

GC = "Group Competence" of Faculty; TA = Student Readiness for "Task Analysis"

for academic tasks and mathematics achievement ($\gamma_{02} = 2.56$, $t = 3.05$, $p < .01$). However, teacher perceptions of faculty group competence ($\gamma_{01} = -1.81$, $t = -1.95$, $p =$ n.s.) did not demonstrate a significant impact on mathematics achievement for the participants in this study (see Table 3).

Discussion

The first research question posed in this study examined the relationship between teacher perceptions of student readiness for academic task analysis and middle grades mathematics achievement. The results showed that mathematics teachers who perceive their students as being ready for academic tasks have students who achieve higher mathematics scores on state assessments compared to their peers who do not have that direct support. One possible interpretation is that teachers accurately perceive student readiness to learn, and this readiness to learn directly correlates with actual learning. Sample items from this factor included statements such as "These students come to school ready to learn," and "Learning is more difficult at this school because students are worried about their safety" (reverse scored). Statistical analyses established a direct connection between teachers' perception of student readiness to learn and student achievement.

However, there are other possible explanations. As discussed in the review of the literature, when teachers feel positive about their students, this makes the teacher more likely to be able to disseminate information effectively (Mosely & Taylor, 2011). Thus, the espousal of confidence in these students' readiness to learn may be positively

Table 2
Descriptive Data

Variable Name	N	Mean	SD	Minimum	Maximum	
Level 1 Descriptive Statistics – Student Responses						
Percent Correct on						
State Math Assessment	964	53.35	19.68	4.00	98.00	
Student Perceptions of						
Faculty Group Competence	964 4.42	0.91	1.00	6.00		
Level 2 Descriptive Statistics – Teacher Responses						
Teacher Perceptions of						
Faculty Group Competence		93	4.45	0.73	1.83	5.83
Teacher Perceptions of Student Readiness						
for Academic Tasks	93	3.22	0.79	1.00	5.50	

Note. N = Number of participants; SD = Standard Deviation

impacting the teacher's own ability to teach. It is also possible that students may be picking up on their teachers' perceptions. If students perceive that their teachers believe they can learn, they may, in fact, be more likely actually to learn. This study adds to the extant literature by demonstrating that teacher perceptions of student readiness to learn is significantly related to mathematics achievement in the middle grades.

The second research question focused on the relationship between student perception of teacher effectiveness and middle grades mathematics achievement. The results demonstrated that when students perceive their mathematics teachers as being effective, their scores rise. Why might this be? We know that students perform well for their teachers when they have an affinity for their teachers (Lumpkin, 2007), so it is possible those students who had an affinity for their teachers rated their teachers' effectiveness more highly and performed better for these teachers. It is also possible that students accurately perceived their teachers' ability. Those they perceived as effective in mathematics are competent. Another possibility is found in literacy studies and is known as the "Peter effect" (Applegate & Applegate, 2004). Essentially, teachers cannot give students what they themselves do not have. If the teachers are not proficient in delivering pedagogy or in mathematics, they cannot engender proficiency in their students. Students tune into competency levels of teachers and draw their own conclusions.

We know from social cognitive theory that the relationships between teachers and students matter (Bandura, 1978; Edmonds, 1979). We also know that when students have a greater voice in their education, their level of engagement and academic success increases (Lounsbury, 2017; Newton, 2014). Asking students for feedback on teacher effectiveness may be a useful way to increase student voices and involve them as democratic partners in their education (Doda, 2011).

Implications

Researchers conducted this study to assist school and district officials who were attempting to identify factors associated with middle grades mathematics achievement so they could improve student learning. Two factors were associated with mathematics achievement for the students in this study: faculty perceptions of student readiness to learn and student perceptions of faculty effectiveness.

One of the items in the task analysis sub-scale was: "Learning is more difficult at this school because students are worried about their safety." Thus, a step that schools could take to improve student readiness to learn would be to improve student safety. Another

Table 3
Results of HLM Random Coefficient Model

Final Estimation of Fixed Effects					
Fixed Effect	**Standard Coefficient**	**Error**	**Approx. T-ratio**	**d.f.**	***p*-value**
For Intercept1, B0 Intercept2, G00	53.473335	0.627327	85.240	90	0.000
Teacher Perceptions of Faculty Group Competence, G01	−1.809876	0.930203	−1.946	90	0.054
Teacher Perceptions of Student Readiness for Task, G02	2.555986	0.837929	3.050	90	0.003
For Student Perceptions of Faculty Group Competence slope, B1 Intercept2, G10	2.773522	0.780149	3.555	959	0.001

Dependent variable: Math Achievement

item was: "Drug and alcohol abuse in the community make learning difficult." Thus, community efforts to reduce drug and alcohol abuse could have an impact on mathematics achievement.

Steps can also be taken to improve mathematics faculty group effectiveness via hiring or training. One item on this subscale was: "Teachers in the school are able to get through to the most difficult students." Getting through to challenging students would be nearly impossible for teachers who do not have a strong grasp of the mathematics concepts they are teaching. It would be equally difficult for teachers who lack pedagogy skills. We believe universities have a significant role to play in this process. Attracting individuals with strong mathematics abilities into the teaching profession has been a persistent challenge, as these individuals may, for example, be able to earn significantly higher salaries elsewhere. However, few professions offer the opportunity to impact the next generation of citizens as directly as education. Finding a way to recruit and retain high-level mathematics scholars as educators is crucial to maximizing student mathematics achievement.

By establishing motivational processes in the mathematics classroom—inclusive of self-efficacy, task interest, and school connectedness (Cleary & Kistantas, 2017)—educators can possibly ameliorate some of the lack of preparation teachers may face. Motivational processes, coupled with professional development to increase teacher proficiency in mathematic strategies, can be an incredibly powerful tool that may yield significant increases in student mathematics achievement in the middle grades.

Limitations

One limitation of this study is that it only examined middle grades mathematics classrooms in south-central Texas, which limits the generalizability of this study. It may be of value to the field to conduct future research in a wider array of classrooms. It may also be useful to examine whether similar results would be found in different regions of the United States or internationally. While researchers explored both teacher and student perceptions at the survey level, there was no qualitative follow up to this study. One possible refinement for future research may be to conduct follow up qualitative interviews with teachers and students in order to more fully understand the context of their survey responses.

Conclusion

The results of this study highlighted two variables that demonstrate a significant relationship with mathematics achievement at the middle level: teacher perceptions of student readiness to learn and student perceptions of teacher effectiveness. These results were shared with school and district leaders and are disseminated here in the hope that this research might contribute in some way to the broader national dialogue regarding middle grades mathematics achievement.

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