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PERFORMANCE AND PREPARATION: ALIGNMENT BETWEEN STUDENT ACHIEVEMENT, TEACHER RATINGS, AND PARENT PERCEPTIONS IN URBAN MIDDLE-GRADES MATHEMATICS CLASSROOMS

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Abstract

The middle grades are a critical transition period in students' mathematics trajectories, as students move from arithmetic to the more complex and abstract concepts of algebra. Teachers' and parents' judgments of students' math abilities in these years are important to instructional planning and decision making for teachers, and can advise parents and students on future course placement. This study specifically examined teacher and parent judgments of students' performance and preparedness for the next grade level in 5th and 6th grades mathematics. Results demonstrate that teacher and parent perceptions of students' abilities are not calibrated to national norms, but to local contexts. Our findings are similar to other work suggesting that high poverty school contexts may provide teachers and parents a false comparative context for judging how well students are mastering mathematical concepts.

Keywords: teacher perceptions, student achievement, mathematics

The middle grades are a critical transition period in mathematics, as students move towards more complex and abstract concepts and from arithmetic into algebra (National Math Advisory Panel, 2008). Achievement in math in the middle grades is also an important factor for future academic success. In a study of students' P-12 math trajectories, Lee (2012) found that middle grades' math competency was a strong predictor of both college entrance and college completion. By the middle grades, differences could most particularly be seen in the math trajectories of racial minorities who are falling further behind desired course trajectories in middle and high school mathematics.

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Research focused on patterns of math achievement and trajectories across elementary and secondary schools has often been approached at a large-scale level, identifying trends in and predictors for performance through large-scale national data sets. What is missing from this previous research is how the most important adults, teachers and parents, in the lives of middle grade students see their academic ability, and how those perceptions might influence students' math trajectories as they move from the early grades into middle and high school.

Literature Review

The Value of Teachers' Judgments

Teacher judgments about students' academic ability are important to teachers' instructional decisions, classroom interactions, and expectations (Barbarin & Aikens, 2015; Borko & Cadwell, 1982; Hurwitz, Elliott, & Braden, 2007). Teachers use their perceptions of students' abilities to inform the way that they organize and teach their classes, and to make changes to their instruction over time (Jackson, Gibbons, & Dunlap (in press). Teachers and schools also use judgments to screen and assess students for special education, gifted education, and other educational decisions (Elhoweris, 2008; Gresham, MacMillan, & Bocian, 1997; Kettler, Elliott, & Albers, 2008). The assumption is that teachers' judgments of students' ability are accurate, and can be used to make good decisions for instruction, assessment, and student placement.

As students enter the middle grades, the accuracy of teachers' judgments may determine whether students are placed in appropriate courses in the future, especially in mathematics (Loveless, 2008). Several studies have found a relatively strong positive correlation between teacher judgments and student ability (Hoge & Coladarci, 1989; Kaiser, Retelsdorf, Südkamp, & Möller, 2013; Südkamp, Kaiser, & Möller, 2012). Correlations suggest that teachers' judgments of student ability may be useful for determining relative ability within a group of students (e.g., rank orders), but they do not provide any evidence of the overall accuracy of teachers' judgments of students' abilities.

In fact, research suggests that not all teacher judgments of student ability are accurate. Prior research examining the relationship between teachers' judgments and student performance has uncovered evidence that teachers are more accurate in their judgments for higher achieving students than for low achieving students (Begeny, Eckert, Montarello, & Storie, 2008; Begeny, Krouse, Brown, & Mann, 2011; Demaray & Elliot, 1998; Feinberg & Shapiro, 2009; Hoge & Coladarci, 1989). This body of work suggests that teachers' judgments may be problematic as indicators of students' absolute ability, even if they are sound indicators of relative ability. This is a particular concern in mathematics, where teachers may use inaccurate judgments of students' abilities to place students in courses for which they are unprepared.

There is also evidence that the decisions teachers and schools make, often based on teacher judgments, may be problematic as well. Findings from a study of the 2005 eighth grade National Assessment of Educational Progress (NAEP) suggested that large numbers of students were enrolled in algebra, geometry, and other advanced math classes for which they were not prepared (Loveless, 2008). Of the students identified in the study as misplaced, about half attended urban schools and nearly two-thirds attended schools classified as high poverty. Students in urban and high poverty schools may be at a higher risk of being placed, by teacher judgment or recommendation, in classes for which they are not prepared.

These findings together suggest a troublesome pattern: low-achieving students in high poverty schools are more likely to have their mathematical abilities inaccurately judged by their teachers and are more likely to be misplaced in math courses. Teachers may well have recalibrated their expectations of students in urban, high poverty schools because the teachers do not hold expectations that students can engage in rigorous mathematical activities (Jackson, Gibbons, & Dunlap, in press). Students' math trajectories in the middle and high school years may be influenced both directly by teachers' judgments of their abilities and indirectly through the course placement decisions in which these judgments play a role. Without any other factors to mediate their consequences, teachers' judgments could have a significant effect on students' later mathematics achievement.

Parent Perceptions and Involvement

One additional mediating factor that may be important to students' mathematics achievement and trajectories in the middle grades and beyond is parent involvement. Parent involvement, across ages and subject areas, has been identified as a small but positive predictor of students' academic achievement (Fan & Chen, 2001). Involved parents can serve as advocates for their children, to help ensure that they receive a high-quality education with appropriate support. In middle school, the most important aspects of parental involvement are related to the students' academic socialization: their expectations, aspirations, strategies, and preparation for the future rather than helping with homework (Hill & Tyson, 2009). Parents' perceptions of students' abilities can influence the ways that they get involved at school, including the expectations and aspirations that they share with their student.

Adult Perceptions and Students' Math Trajectories

Children from racial minorities and low-income families are more likely to attend high poverty schools (Kena et al., 2015; Saporito & Sohoni, 2007), and they also begin to fall further behind in math skills during the middle grades period (Balfanz & Byrnes, 2006). By the end of high school, many low-income and minority students have followed math trajectories that have not prepared them for college entrance, or college completion, at two- or four- year colleges (Lee, 2012; Long, Iatarola, & Conger, 2009). However, little is known about how teacher and parent judgments might lead to these differential trajectories. A recent study has demonstrated the puzzling finding that low income minority parents whose children attend high minority schools (mostly urban) actually have higher expectations for their children than those whose children attend low minority schools (Lawrence, 2015). For high SES families, school composition was irrelevant to their expectations. It is possible that in high poverty, high minority, urban schools, parents are not being provided accurate indications of their children's achievement.

This study examined the relationship between student performance on direct assessments of mathematics skills, teacher reports of students' math skills and preparation, and parent reports of students' math skills for a low-income, primarily minority urban population. This study also considers the implications of this relationship to students' math trajectories. The study was guided by the following research questions:

1. How do teacher reports of students' ability and preparation in math relate to students' directly assessed performance in a low-income, urban middle school population?

2. How do parent reports of students' performance in math relate to their children's directly assessed performance and to teacher reports of students' math ability and preparation in a low-income urban middle school population?

Methods

Study Design

This study was part of an ongoing longitudinal study (Farran, Rittle-Johnson, Price & McCandliss, 2014) focused on middle grades math achievement in grades 5 to 8 for children from high-risk families in an urban school district in the southeastern United States. The study was designed to examine students' mathematical competencies across a critical transition period from arithmetic to algebra. In the spring of each year, students were assessed on their math skills, and their math teachers completed questionnaires. Beginning in the 6th grade year, background data and student expectations were also collected from parents.

Participants

There are 519 students in the entire sample who were assessed during what was for most of them their 5th and 6th grade years. This study is restricted to those students who were on grade level — neither retained (76 in 5th grade year; 86 in 6th grade year) nor advanced (1 in 5th grade year; 1 in 6th grade year) and whose math teachers provided teacher ratings of their performance in class, resulting in an analytic sample of 401 students in the 5th grade year and 417 students in the 6th grade year. This sample was 41.1% male, 77.3 % African-American, and 9.2% Hispanic in the 5th grade, with an average age of 11 years and 0 months at the time of testing. In the 5th grade sample, 83.3 % qualified for free or reduced priced lunch and 10.7% were English Language Learners in pre-kindergarten. In the 6th grade year, this sample was 40.0% male, 78.4% African American and 8.9% Hispanic, with an average age of 12 years and 1 month. Of this sample, 84.7% qualified for free and reduced price lunch and 9.8% were English Language Learners in pre-kindergarten. The students attended 42 different schools in 5th grade and 50 schools in 6th grade, including charter and traditional middle schools. A subset of this group also had parental ratings. Some parents declined or were unreachable for an interview. Thus the 6th grade analyses including the parent interview involve a subsample 397 students who had both teacher ratings and parent interviews. The demographics for the subsample of parents who responded to the interview are very similar to the larger 6th grade sample (40.6% male; 79.6 % African American; 8.3% Hispanic, 84.9% FRPL in pre-k, 9.3% ELL in pre-k).

Measures

Key Math 3 Diagnostic Assessment (Connolly, 2007). Students were assessed in 5th and 6th grades using three subscales from the *Key Math 3 Diagnostic Assessment*: Numeration, Algebra and Geometry (Connolly, 2007). Trained research assistants individually assessed students at their schools in the spring of each year.

Teacher Questionnaire. Each spring, students' assigned math teachers were asked to complete a researcher- developed survey about the teacher's background, math classroom, and each participating student. Two important variables were drawn from this measure: the teachers report of students' math skills compared to others in the same grade level, and the teacher's report of how prepared the student was for the next level in math. Students' math skills were rated on one of five categories: far below average, below average, average, above average, and far above average. Student preparation for future math classes was rated as: very unlikely to be prepared, somewhat unlikely to be prepared, may struggle but is prepared, mostly prepared, or highly prepared.

Parent Interview. In the winter of the students' 6th grade year, trained interviewers conducted parent interviews by phone. The parent interview addressed parents' perceptions of their student's performance in math, rated on the same scale as teachers, from far below average to far above average.

Analytic Approach

A descriptive, quantitative approach was used in this study to explore the relationships between student performance and adults' reports of students' ability in 5th and 6th grade math. For each year, student achievement subscale scores and teacher reports were correlated to examine the relationship between the teacher reports of mathematics ability and preparation and each of the math achievement subscales.

To compare the mathematics achievement of students according to their teacher reported ability and preparation, students were divided into subgroups by teacher rating level (e.g. far below average, below average, etc.), and the means for each of these subgroups were compared using one-way analysis of variance (ANOVA). Tukey's honest significance difference (HSD) test was applied post-hoc to examine the differences between the groups.

Parallel analyses were conducted using the parent reports of student ability in 6th grade mathematics, including correlations with students' assessed achievement, as well as analysis of variance for subgroups and multiple comparisons across subgroups.

Results

The zero order correlations using Pearson product moment correlations are presented in Table 1. As can be seen in Table 1, teacher reports of students' math performance were moderately correlated with students' tested math performance in both 5th and 6th grades, with slightly stronger correlations in 6th grade. The correlations ranged from .44 for Geometry in 5th grade to .62 for Algebra in the 6th grade. Parent reports, collected in the 6th grade year, were correlated with teacher 6th grade reports (r=.43) and correlated with 6th grade student math subscale achievement (r ranges from .37 to .44) slightly lower than the teacher correlations.

Tables 2 and 3 present the average scores of the students for each of the teacher rating levels. Comparing the average scores across teacher-reported math skills ratings indicates that teacher reports of math ability in both 5th and 6th grades align with student performance *within* the study population. An increase of one rating level on the teacher reported ability scale corresponds to an increase in grade-equivalence on each of the subscales in each grade. It is important to remember that the students were assessed in the late spring of their 5th and 6th grade years when, if their grade equivalent scores were average by national norms they would have been 5.8 and 6.8 respectively.

An analysis of variance (ANOVA) on the grade-equivalent scores for each subscale yielded significant variation among teacher-reported math skills groups (see Tables 2 and 3).

Table 1
Zero-Order Correlations among 5th and 6th Grade Direct Assessments and Teacher and Parent Ratings

	Fifth Grade		Sixth Grade		
	Teacher-reported Math Ability	Teacher-reported Math Preparation	Teacher-reported Math Ability	Teacher-reported Math Preparation	Parent-reported Math Performance
Fifth Grade					
KM Numeration	.56***	.55***	.56***	.50***	.42***
KM Algebra	.58***	.58***	.54***	.51***	.43***
KM Geometry	.44***	.41***	.46***	.44***	.38***
Sixth Grade					
KM Numeration	.54***	.56***	.59***	.53***	.42***
KM Algebra	.55***	.54***	.62***	.58***	.44***
KM Geometry	.48***	.44***	.49***	.46***	.34***

Note. The sample sizes for the correlations vary. Based on the year of the measure, and how many students were administered. Within 6th grade n=417, within 5th grade n=401, across 5th and 6th grade n=376, parent measure n=357.
***p<.001

A post-hoc Tukey test showed that in 5th grade all groups differed significantly except for the *far below average* and *below average* groups on the Numeration and Geometry subscales. In 6th grade the Tukey test showed that the *far below average* and *below average* groups differed on all but the Geometry subscale.

While teacher judgments of skills were accurate relative to others in this low-income urban population, they were not aligned with the norms for the Key Math assessment. As shown in Tables 2 and 3, the mean grade-equivalent scores of students reported by their teachers as having *average* math skills were well below what would be expected based on the normed sample. As noted above, based on the time of the year that students were assessed, we would anticipate a mean of around 5.8 in the 5th grade year and around 6.8 in the 6th grade year. In contrast, the means in 5th grade were 4.32 (Numeration), 4.56 (Algebra), and 3.96 (Geometry). In 6th grade the subscale means were 5.35 (Numeration), 5.56 (Algebra), and 5.04 (Geometry). All of these means are a year and a half to two years below the normed expectations for students in the spring of fifth grade. Geometry is close to 2 years below the norm. In fact, only 36.9% (148) of the students scored *at or above* a grade equivalent of 5.8 (spring of fifth grade) on any subscale and only 10.7% (43) did so on all three subscales in 5th grade. In 6th grade, only 38.4% (160) of the students scored at or above a grade equivalent of 6.8 (spring of sixth grade) on any subscale and only 9.8% (41) did so on all three subscales.

Table 2
One-Way ANOVA Results of Grade-Equivalent Scores on Key Math Subscales by Teacher-Reported Math Skills in 5th Grade

Math skills	n	Numeration Mean (SD)	F	Algebra Mean (SD)	F	Geometry Mean(SD)	F
Far below average	28	2.54 (1.04)	44.95***	2.40 (1.21)	49.46***	2.80 (1.44)	24.20***
Below average	103	3.44 (1.41)		3.62 (1.15)		3.25 (1.49)	
Average	131	4.32(1.57)		4.57 (1.57)		3.96 (1.78)	
Above average	109	5.43 (1.86)		5.54 (1.66)		4.91 (2.16)	
Far above average	30	6.78 (2.04)		6.49 (1.72)		6.05 (1.53)	

****p* <.001, N=401

Table 3
One-Way ANOVA Results of Grade-Equivalent Scores on Key Math Subscales by Teacher-Reported Math Skills in 6th Grade.

Math skills	n	Numeration Mean (SD)	F	Algebra Mean (SD)	F	Geometry Mean(SD)	F
Far below average	33	3.18 (1.52)	55.54***	3.27 (1.25)	63.74***	3.50 (1.72)	33.36***
Below average	121	4.22 (1.56)		4.30 (1.50)		4.19 (1.59)	
Average	154	5.35 (1.75)		5.56 (1.79)		5.04 (1.89)	
Above average	92	6.85 (1.88)		7.22 (2.08)		6.17 (1.81)	

Far above average	17	8.02 (1.31)	8.57 (1.68)	7.86 (1.76)

***p <.001, N=417

Teacher ratings of student preparation for the next grade level are presented in Tables 4 and 5 along with the students' actual scores for each rating category. When 5th grade math teachers reported their students' level of preparation for the next level of math, 75.6% of the students were described as *highly prepared, mostly prepared, or prepared even if they might struggle*. In 6th grade, teachers are somewhat more realistic and the percentage is reduced to 67.1%. The average actual achievement of students who were considered to be mostly prepared suggests that teachers may have recalibrated their expectations, lowering them to meet the performance of the group. In both grades, the mostly prepared group is between half and a full grade level behind the national norm. The group that teachers reported as *prepared, but may struggle* is even further behind at nearly two grade levels behind across subscales and years.

Table 4

One-Way ANOVA Results of Grade Equivalent Scores on Key Math Subscales by Teacher-Reported Math Preparation in 5th Grade

Math preparation	n	Numeration Mean (SD)	Numeration F	Algebra Mean (SD)	Algebra F	Geometry Mean(SD)	Geometry F
Very unlikely to be prepared	31	2.68 (1.23)	44.00***	2.44 (1.13)	52.61***	2.78 (1.40)	20.73***
Somewhat unlikely to be prepared	67	3.22 (1.31)		3.64 (1.21)		3.29 (1.46)	
May struggle, but is prepared	101	3.95 (1.48)		3.99 (1.30)		3.57 (1.76)	
Mostly prepared	132	4.98 (1.76)		5.17 (1.70)		4.57 (1.96)	
Highly prepared	70	6.17 (1.99)		6.16 (1.62)		5.39 (2.04)	

***p <.001, N=401

Table 6 presents the average scores for the students by rating level of their parents. Overall, students whose parents rated them as *much below* or *below average* performed worse on the direct assessments than students whose parents rated them as *above* or *much above average*. Similar to the ratings of the 6th grade teachers, within each rating group, there was considerable variability, especially at the high end of the rating scale. In addition, all of the parent-rated groups had means below the normed expectations except for the *much above average* group on the Algebra subscale. An analysis of variance (ANOVA) on the grade-equivalent scores for each subscale yielded significant variation among parent-reported math performance groups (see Table 6). A post-hoc Tukey test indicated that the subgroups were not as distinct as in the teacher reports. Tukey's HSD identifies 2-3 homogenous subsets, with the average group overlapping heavily.

Table 5
One-Way ANOVA Results of Grade Equivalent Scores on Key Math Subscales by Teacher-Reported Math Preparation in 6th Grade.

		Numeration		Algebra		Geometry	
Math preparation	n	Mean (SD)	F	Mean (SD)	F	Mean(SD)	F
Very unlikely to be prepared	46	3.77 (1.80)	43.83***	3.68 (1.49)	55.189***	3.96 (1.78)	31.53***
Somewhat unlikely to be prepared	91	4.24 (1.57)		4.73 (1.60)		4.06 (1.65)	
May struggle, but is prepared	117	4.94 (1.88)		5.07 (1.80)		4.82 (1.86)	
Mostly prepared	118	6.17 (1.79)		6.47 (1.96)		5.56 (1.84)	
Highly prepared	45	7.55 (1.68)		8.15 (1.92)		7.27 (1.69)	

****p* <.001, N=417

Table 6
One-Way ANOVA Results of Grade Equivalent Scores on Key Math Subscales by Parent-Reported Math Performance in 6th Grade.

		Numeration		Algebra		Geometry	
Math performance	n	Mean (SD)	F	Mean (SD)	F	Mean (SD)	F
Much below average	6	3.27 (0.85)	24.23***	3.37 (0.60)	24.67***	3.27 (1.20)	15.83***
Below average	35	3.46 (1.70)		3.66 (1.89)		3.59 (1.93)	
Average	198	4.85 (1.78)		4.99 (1.86)		4.68 (1.77)	
Above average	125	6.26 (2.00)		6.42 (2.11)		5.76 (1.94)	

Far above average	33	6.46 (2.09)	7.14 (2.50)	6.22 (2.50)

***p <.001, N=397

Discussion and Implications

In this longitudinal study of the math achievement of a large urban sample of middle grade students, we compared teacher and parent ratings of achievement and preparation for the next grade level to the actual achievement of the students in three different areas of mathematical competence. The majority of the students were a full grade or two grade levels behind national norms. What this means in practical terms is that for every year students had attended schools in this high poverty urban district, they were making 2/3 the progress they should have been making. Teacher ratings mirrored the distribution within the sample but not national norms; students were perceived by their teachers to be average achievers and prepared for the next grade level despite being at least a grade level or two behind the national average. Parent ratings were modestly correlated with teacher ratings but showed the same distributional effect – inflated ratings for the actual achievement of the children.

Teacher judgments of students' ability are important to instructional planning decisions, and student placement in courses. Our findings confirm prior research suggesting that these judgments are not accurate for all students (Begeny et al., 2008; Begeny et al., 2011; Demaray & Elliot, 1998; Feinberg & Shapiro, 2009; Hoge & Coladarci, 1989). The misalignment we found between students' scores, national norms, and teacher ratings of math skills is consistent with the previous literature. Specifically, teachers overestimate students' math skills when students are at or below grade level (Eckert, Dunn, Codding, Begeny, & Kleinmann, 2006).

Teachers' reference points are critical to understand the differences between student achievement and teachers reports of their math skills. First, it must be acknowledged that the teachers may have interpreted the question as asking about each student in comparison to other students *at their school.* For example, teacher ratings from the Early Childhood Longitudinal Study (ECLS-K) data from Kindergarten to Grade 5 indicated that teachers evaluated students' performance relative to others in their school (Martinez, Stecher, & Borko, 2009). By this metric, teachers have done a good job of ranking students in relation to other students that they know and work with regularly. Second, the teachers working with the students in our study may have worked primarily with other low-income and racial minority urban students throughout their career. This type of experience is likely to affect their understanding of students' ability and skew expectations of what it means for a student to be prepared for the next grade level in math.

The results relating teacher reports of student preparation and student achievement suggest that teachers are not referencing national norms. Students whose teachers rated them as prepared were a year or more behind the norms. This trend persists between 5th and 6th grades, suggesting that many students are not prepared for the math at the next grade level, although their teachers believe they are.

Parent reports of student performance in math are less differentiated than teachers' reports of student ability. This may be because parents do not have the professional experience or skill necessary to differentiate their students in nuanced ways. Parents were most likely to rate their children as *average* or *above average.* Parents may be basing their judgments of their children's mathematical progress on how teachers perceive the students. In these high poverty, high minority schools, lowered expectations for performance from teachers may permeate the schools and be communicated to parents as average, meaning average for this group of students. Parents may not be aware of this recalibration nor therefore of the need to advocate for additional educational support to improve their child's mathematics achievement.

This study had several limitations that must be considered along with the findings. First, the full sample of students who were assessed was not included in analyses presented here. Each year, students were excluded who had been retained or, in one case, promoted early. The potential is that these students were different from the overall sample. The demographics suggest that these students may be somewhat different demographically. In both, 5th and 6th grades, the excluded students were more likely to be male (51.7% in 5th grade; 56.9% in 6th grade) than their on-grade level peers. In 5th grade a higher percentage of excluded students were African American (83.9%) while in 6th grade a slightly lower percentage (77.5%) were African American. The differences in the retained students suggest that our findings may not hold for students who were retained.

However, including the retained students would muddle the question under investigation. We don't know why these students were retained (or promoted). The math scores for these students may be at variance from their grade placement if they were retained primarily for reading delays. In addition, since we asked about teachers' perceptions in that grade level, including teachers from another grade level could confound the results further.

In addition, the analysis sample was limited to those students for whom we were able to collect teacher and parent reports. Extensive efforts were made to reach teachers and parents and to encourage them to participate; however, some declined or were unable to be reached. Out of 426 students who were enrolled in 6th grade in the second year of the study, 397 parents were reached, for a response rate of 93%. This missing data may be responsible for some non-response bias, but the high response rate is encouraging for the generalizability of the results.

In addition, our surveys of parents and teachers' expectations were conducted by telephone (parents) or online (teachers). We did not interview either group about the bases for their judgments and so we do not know how much either group really knew about math achievement expectations for children in these grades, though teachers should have known more. Finally, we only have a highly impoverished, primarily minority sample of children attending high poverty schools in an urban district. We do not know whether recalibration of teacher expectations happens in schools serving a different population of children. Other research suggests that higher SES parents, at least, make their judgments about their children based more in line with individual child characteristics and are less influenced by the characteristics of the schools (e.g., Lawrence, 2015). But we do not know if the same is true of teachers in different types of schools.

The results of this study suggest that students considered to be average and prepared by both their teachers and parents are actually at least a year and mostly much more behind national norms in learning math content. In low-income urban schools, teachers may *recalibrate* their expectations for the population of students they are working with. If instructional decisions and students' future placements are made with reference to teachers' judgment of ability and preparation, then misalignment with national norms could have far-reaching implications for students' future achievement in mathematics.

In order to support low-income and racial minority urban students in middle-grades mathematics and beyond, more attention to the calibration and recalibration of teachers' judgments to local and national norms may be necessary in future research and teacher professional development. As Jackson et al. (in press) argue, in order for students to be exposed to more rigorous mathematical activities, it may be necessary to force urban teachers to reframe their expectations.

More research is needed to identify how extensive recalibration is among teachers in urban schools, particularly in grades 4-8, when the mathematics achievement gap seems to expand most quickly (Lee, 2012). Second, research could be used to identify factors that are associated with the recalibration of teacher judgments, from individual and classroom characteristics to school and district policies. In addition, future research could explore situations in which using teachers relative judgments within a population is beneficial and sufficient for supporting student success in mathematics and situations when accurate or normed judgments of student achievement are critical.

It is also important for teachers and other practitioners to have knowledge about the merits and uses of relative and absolute judgments of student achievement. Based on the findings of this study and others, it is likely that professional development work will be needed to support teachers in using their information and data about students in their classrooms to promote productive student placement and mathematical development.

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